

In This Issue—An Interview With Henry Ford

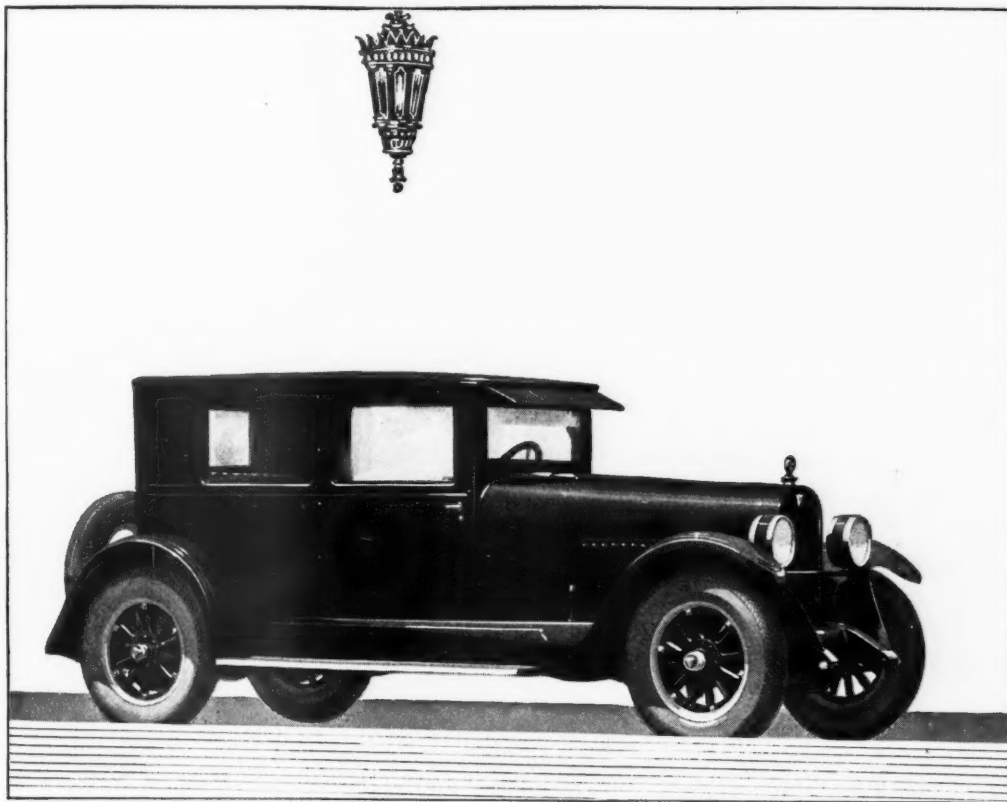
# MOTOR AGE

Vol. XLVI  
Number 9

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CHICAGO, AUGUST 28, 1924

Thirty-five Cents a Copy  
Three Dollars a Year

## The Improved COACH on the HUDSON Super-Six



### For the First Time in History

Closed Car Comforts  
at **EXACTLY**  
Open Car Cost

Full Size, GENUINE  
**BALLOON** Tires

*The Easiest Steering and  
Riding Hudson Ever Built*

**\$1500**

Freight and Tax Extra

This Hudson Coach makes history. It is the first closed car ever to sell at exactly open car cost.

And Hudson, alone, can build it. As the largest producer of 6-cylinder closed cars in the world, Hudson exclusively holds the advantages to create this car and this price.

#### *Greatest of all Hudson Achievements*

And now full size balloon tires are standard equipment. Do not confuse with "semi-balloon" types. Hudson's are genuine full size balloon tires—33 in. x 6.20 in. Compare the difference.

Hudson has not simply "added balloon tires." Both running and steering gear have been especially designed to compensate for the radical differences balloon tires bring. The result is the easiest steering, most comfortable and

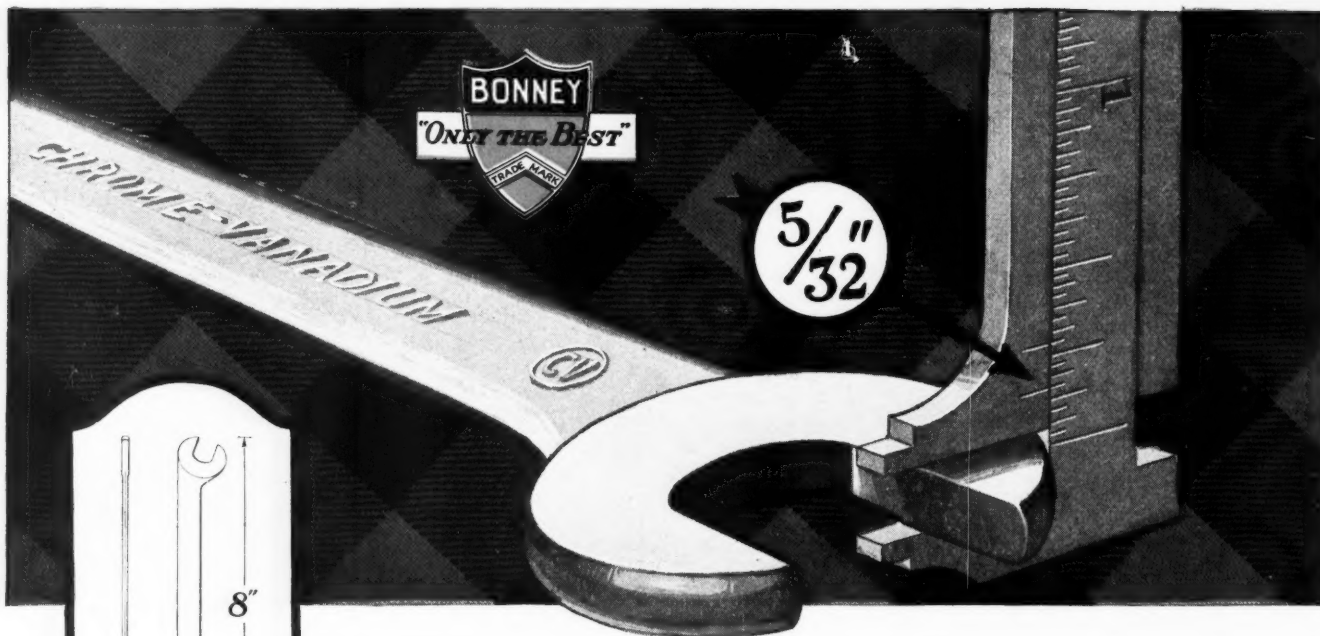
steadiest riding Hudson ever built. And braking efficiency is almost doubled.

Note how fast the Coach is displacing open cars. Never will their old-time popularity return. And the rate of open car depreciation grows swifter as knowledge of this condition spreads. Consider what a used open car will bring a year from today.

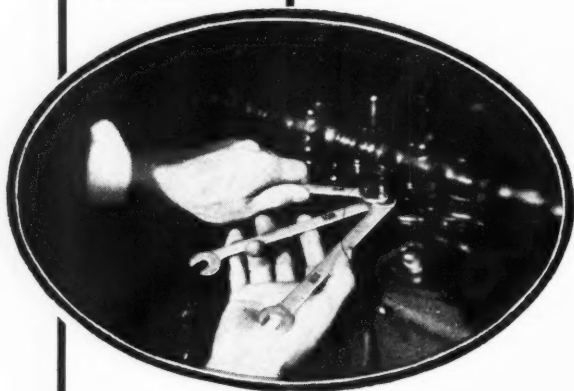
As the wanted type the Coach maintains the highest resale value against the waning desirability of the open car.

*Replacement of 9,000,000 Open Cars Is Your Market With the Coach*

HUDSON MOTOR CAR COMPANY, DETROIT



Bonney "CV" Tappet Wrenches are made with a very thin head ( $5/32$  in. thick) and they are 8 inches long with the head offset at an angle—two important features that take care of thin nuts in any radial position.



The length saves your knuckles from burn or bruise on the hot motor, which is when adjustments should be made. As most cars require three wrenches to make a proper adjustment these wrenches are designed so that two can be worked like scissors in one hand while the third is used in the other hand.

## *Extra thin, but extra strong—and long*

### **TAPPET WRENCHES of Chrome- Vanadium**

The thinness, the double strength, and length of Bonney "CV" Tappet Wrenches make tappet adjusting easier, quicker, and more accurate.

A head as thin as  $5/32$ " with a strength twice that of carbon steel is possible only by use of heat treated drop forgings of that super alloy steel, *Chrome-Vanadium*.

These wrenches are practically indestructible and are built to satisfy the most critical mechanics.

Sold singly or in kits, by most jobbers.

Buy a kit and be fully equipped.

*Made in U. S. A.*

**Bonney Forge & Tool Works  
Allentown, Pa.**

*Also makers of Special Service Wrenches of Chrome-Vanadium, Carbon Steel Drop Forged Wrenches, Stillson Wrenches, Vises and Drop Forgings.*



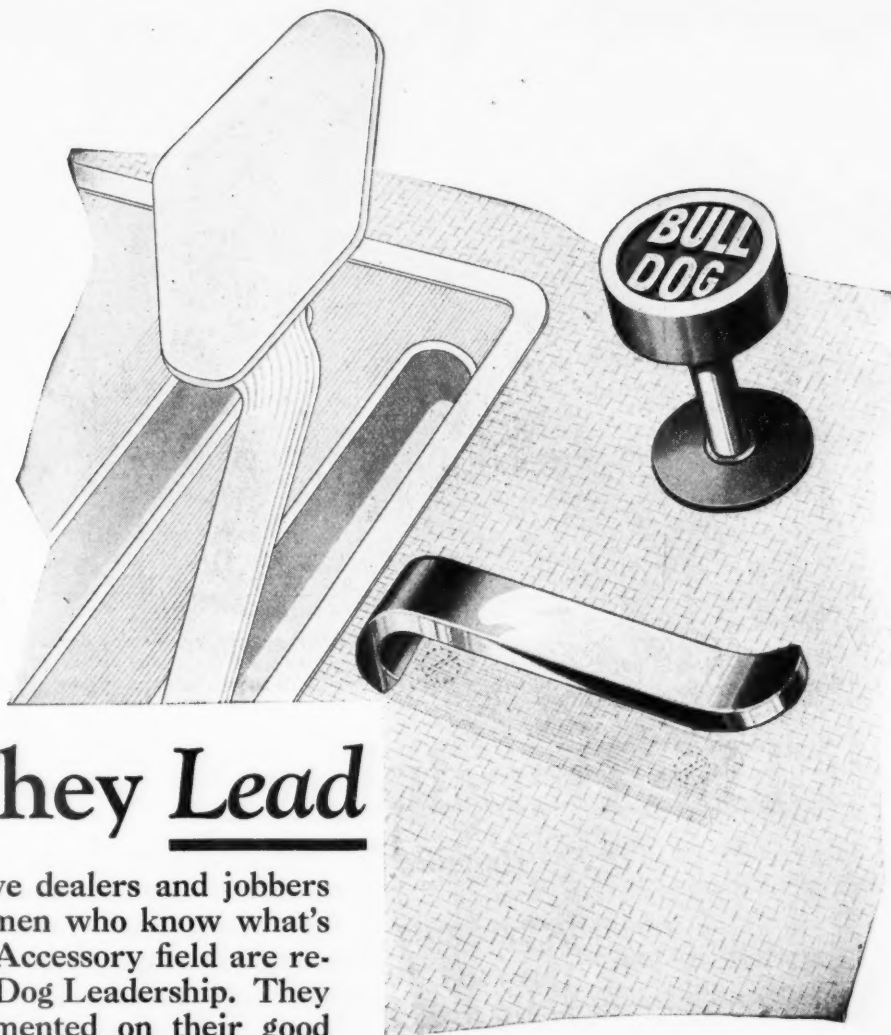
Set No. 412 consists of two each Nos. 402, 403, 404 and 405 "CV" Tappet Wrenches. This set will take care of the adjustment of valve tappets on 45 passenger cars and trucks. Price, east of Mississippi River, in cloth-lined leatherette case, \$10.00; slightly higher west of the Mississippi and in Canada.

"CV" is a Bonney trade mark registered in the U. S. Pat. Office.

# **BONNEY** *Chrome-**"CV"** Vanadium* **WRENCHES**



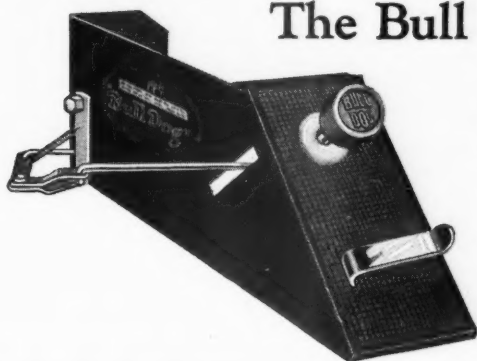
## THE BEST ACCELERATOR FOR FORDS



## Why They Lead

The Automotive dealers and jobbers of America—the men who know what's what in the Ford Accessory field are responsible for Bull Dog Leadership. They are to be complimented on their good business judgment in continuing to concentrate their sales efforts on Bull Dog Foot Accelerators—known, tried and chosen by over a million Ford owners.

Retail Price \$1.50 (\$1.90 in Foreign Countries). Each Accelerator packed in an attractive display carton.

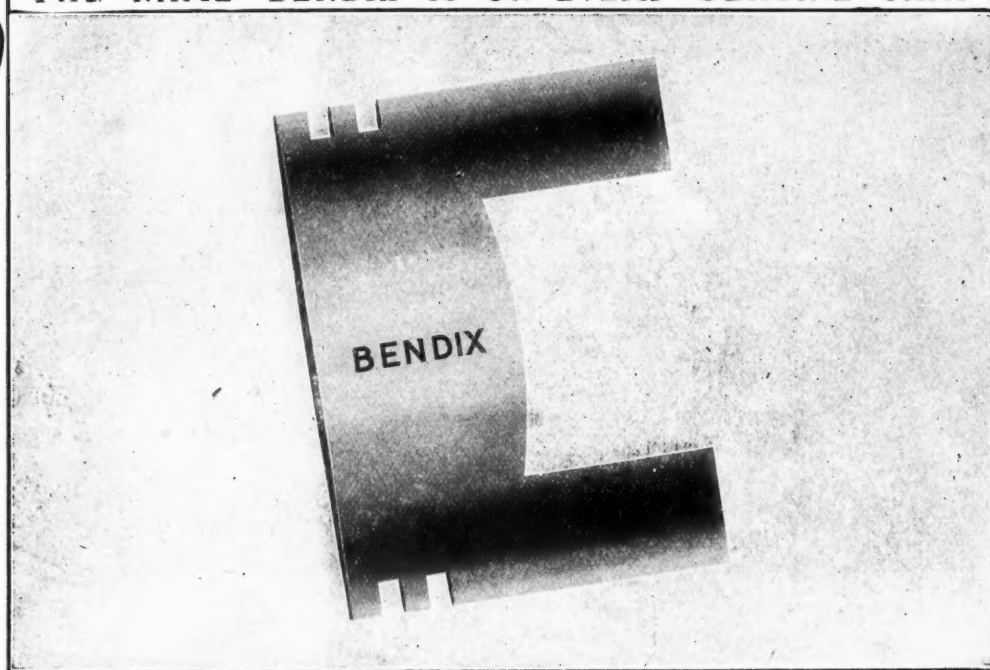


## The Bull Dog Counter Merchandizer

A handsome, compact metal counter display which shows the simple, easy, positive action of the Bull Dog assembly in an interesting way. On your counter the Bull Dog Merchandizer will attract many sales, as the Ford Owner can't resist trying the accelerator he has heard so much about. Every dealer *may* have the use of this business builder—FREE. Ask your jobber about it.

THE W. H. THOMAS MANUFACTURING CO., SPENCER, IOWA

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(Patent Pending)

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*(Installed Without Special Tools)*

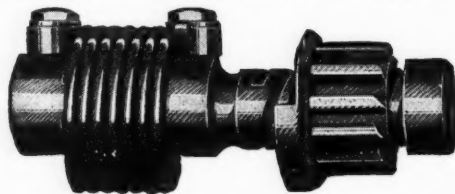
A hammer and a blunt chisel are the only tools required to do the work quickly and easily. Three sizes give service on all models

See Chilton "Yellow" Directory for Bendix Service Data

It pays to sell none but  
**GENUINE PARTS**  
 FOR  
**BENDIX**  
**DRIVE**

**ECLIPSE MACHINE CO., ELMIRA, NEW YORK**

*Eclipse Machine Company, Ltd. - Walkerville, Ontario*



# MOTOR AGE

Vol. XLVI

No. 9

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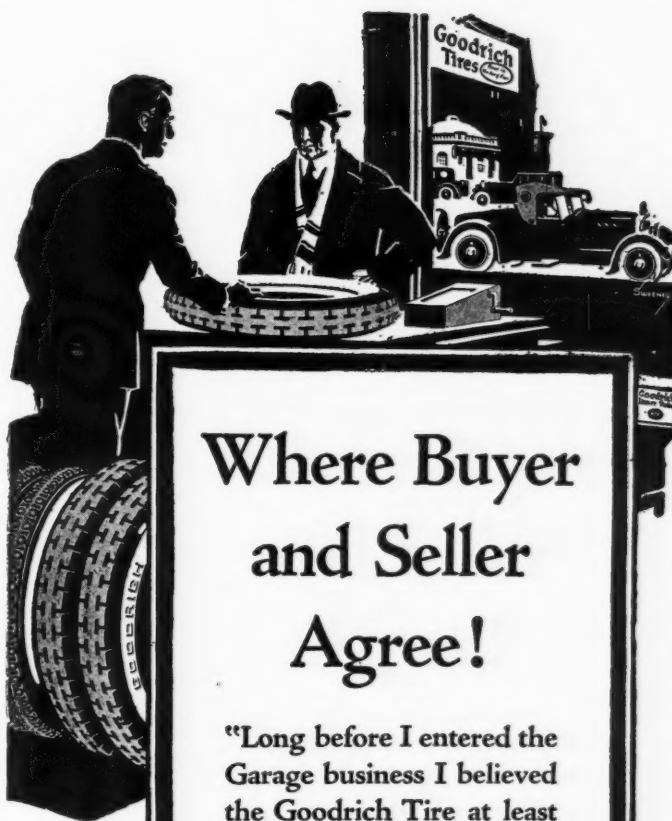
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## CONTENTS

Dealer and Maintenance Field Expands as Nation's Registration Grows .....	10
<i>By Clarence Phillips</i>	
Decentralization of Industry Under Way, Says Henry Ford .....	12
<i>By Drew Pearson</i>	
Further Advantages of the Lathe in the Automotive Shop .....	15
<i>By B. M. Ikert</i>	
1925 Willys-Knight Engine Equipped With Lanchester Harmonic Balancer .....	17
Velie 1925 Line Comprises Entirely New Body Designs .....	20
MOTOR AGE'S Picture Pages of Automotive Interest .....	22
The Readers' Clearing House .....	24
Boosting Accessory Sales .....	29
Getting More Out of the Shop .....	30
Buick Branch at Indianapolis in New Home .....	31
Editorials .....	32
<b>News of the Industry—</b>	
Retail Sales Show Improved Tone .....	33
Northwestern States Have Good Outlook, Declares Vane .....	34
Deal Pending With Canadian Capital for Roamer Purchase .....	35
Auburn Raises Prices on All Models .....	36
13,922 Authorized Ford Dealers in World .....	37
N. A. D. A. Going Ahead With National Sales Congress Plan .....	38
October Is Month Selected for Annual Show at Oakland .....	39
Cord Tires Continue to Gain Over Fabrics in Users' Favors .....	40
Ford Mines Will Distribute Coal in Northwest Market .....	41
With the Associations .....	42
Squeeks and Rattles .....	43
Coming Motor Events .....	43
Specifications .....	44
BROADCASTER DEPARTMENT .....	97
INDEX TO ADVERTISEMENTS .....	98-99

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## Where Buyer and Seller Agree!

"Long before I entered the Garage business I believed the Goodrich Tire at least the equal of any on the market. Since selling tires I maintain that Goodrich is without an equal and I believe the public thinks as I do.

When I stocked Goodrich I thought it wise to add a few of another standard make thinking they might be preferred. I offered my customers their choice and without exception they chose Goodrich."

RHODE ISLAND GARAGE  
Buffalo, N. Y.

*Build with Goodrich  
for Permanency*

THE B. F. GOODRICH RUBBER CO.  
Akron, Ohio  
ESTABLISHED 1870

# Goodrich

## TIRES

*"Best in the Long Run"*



## The Travel-Proof Top Material

**C**HASE DREDNAUT solves the service problem for it is made to withstand travel. It is likewise a reputation-builder for the trimmer who wisely furnishes it to *all* patrons.

It takes a notable material of this sort, allied with your expert workmanship to make every re-top job complete and satisfactory.

**CHASE**  
**DREDNAUT**  
Motor  
Topping

"DEFIES TIME AND THE ELEMENTS"

◆◆◆

**L. C. CHASE & CO., BOSTON**

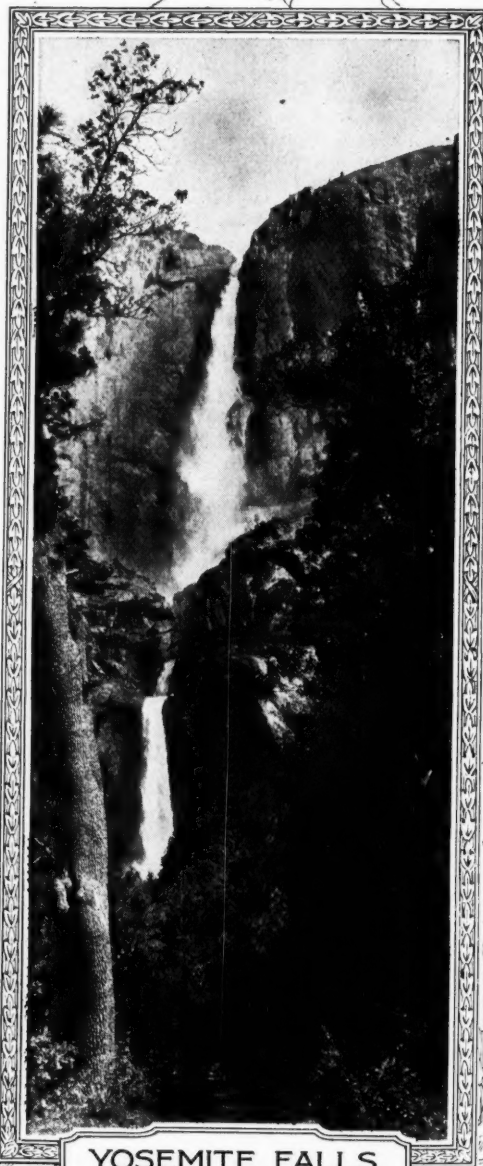
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DETROIT

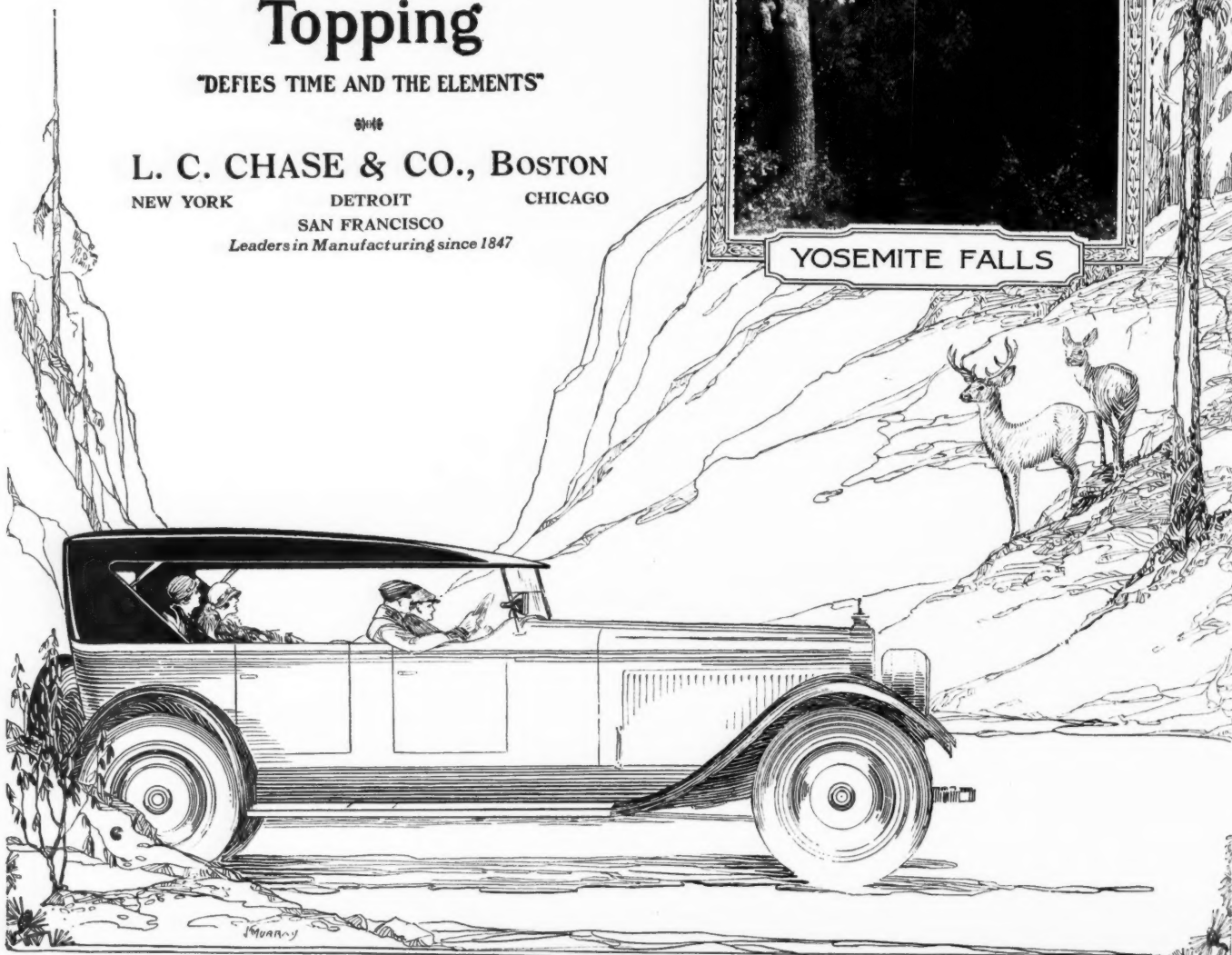
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Leaders in Manufacturing since 1847

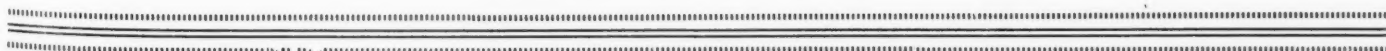


YOSEMITE FALLS



In the next two issues of this magazine, one of the world's largest motor-car makers will have announcements of *vital* interest to

EVERY  
MOTOR-CAR  
DEALER  
IN AMERICA!



# NASH

*Picturing the New  
Special Six Sedan*



**\$1295**

*f. o. b. Factory*

## *Here's a New Enclosed Car That Shatters All Value Precedents*

Nash has sprung a sensational surprise by putting such a low price on this Special Six Sedan for five passengers.

From the dealer's standpoint it bids fair to be the greatest money-making model that Nash has ever produced.

Chief among its selling features are 4-wheel brakes specially designed by Nash; full balloon tires and five disc wheels as standard equipment; a new force-feed oil lubricating system; and refined six-cylinder performance.

There's a one-piece windshield, an in-built sun visor, an automatic windshield wiper, cowl ventilator of flush type and other points of

practical selling value too numerous to mention here.

How many cars like this could you market if you had the Nash line in your territory?

Just take a pencil and figure out your opportunity for profits with the new Advanced Six and Special Six Series. Then wire today about a contract.

*Prices and models are as follows: SPECIAL SIX Series: 5-Pass. Touring, \$1095; Roadster, \$1095; 5-Pass. Sedan, \$1295; f. o. b. Milwaukee. ADVANCED SIX Series: 5-Pass. Touring, \$1375; 7-Pass. Touring, \$1525; Roadster, \$1375; 5-Pass. Sedan, \$1695; 4-Door Coupe, \$2190; 7-Pass. Sedan, \$2290; f. o. b. Kenosha.*

**THE NASH MOTORS COMPANY, KENOSHA, WISCONSIN**

(\$15)



*The Refined*

# OLDSMOBILE SIX

PRODUCT OF GENERAL MOTORS



*New Beauty outside — but same  
good chassis 40,000 owners know!*

**Dealers**—If the Oldsmobile franchise in your territory is open—get in touch with us at once.

Styles change! But the laws of mechanics are fixed! Last year—Oldsmobile brought out the best light six that all its vast manufacturing facilities, *plus* the resources of General Motors, could produce. Q Designed right, at the outset—time tested and time proved—Oldsmobile now finds that splendid chassis design too good to change! Improved? Yes! But in all essentials, the Refined Oldsmobile Six remains the same good car. Q There is a new style of radiator and hood! More graceful lines! Cowl lights! Beautiful and enduring Duco satin finish! Instruments are grouped on a single panel—and there are many other up-to-date refinements—and the price is right.

Touring Car  
**\$875**

Roadster \$875, Sport Roadster \$985, Sport Touring \$1015, Cab \$1045, Coupe \$1175, Sedan \$1250, De Luxe Sedan \$1350. The G. M. A. C. extended payment plan makes buying easy. All prices f. o. b. Lansing. Tax and spare tire additional.

OLDS MOTOR WORKS, LANSING, MICHIGAN  
OLDS MOTOR WORKS OF CANADA, LTD, OSHAWA, ONTARIO

# The Good MAXWELL

## Gathering Momentum

Dealers are watching Maxwell-Chrysler developments with interest. Everywhere the feeling is crystallizing that here is a line which is destined to become a more and more pressing competitive factor in the industry.

The recent participation of the Chrysler engineering staff in the production of refinements and betterments in the good Maxwell makes it as superior in the field of Fours as is the Chrysler in the field of Sixes.

Thus Maxwell-Chrysler today consists of two outstanding cars—each a leader in its field.

Here, then, is a combination that equips a dealer to do a really profitable business, and on a sounder, surer basis than can be equalled even by a combination of two or more other cars.

The swing towards Maxwell-Chrysler is one of the big developments of the current year. It is gathering momentum every month.



Proof of this is to be found in the fact that such well-known merchandisers as R. H. Collins, Guy O. Simons, Walter F. Wright, L. E. Frey, have recently joined Maxwell-Chrysler as distributors in Chicago, Brooklyn and Long Island, Cleveland and Altoona, Pa.

Obviously these men, with their years of experience, their capital resources and opportunities open to them, choose Maxwell-Chrysler in preference to all others simply and only because they recognize the trend of events and the exceptional assurance of profit offered by Maxwell-Chrysler. Now is the time for you to act. Write or wire for full details.

*All Maxwell and Chrysler dealers are in position to extend the convenience of time-payments, on a plan that is attractive to the buyer.*

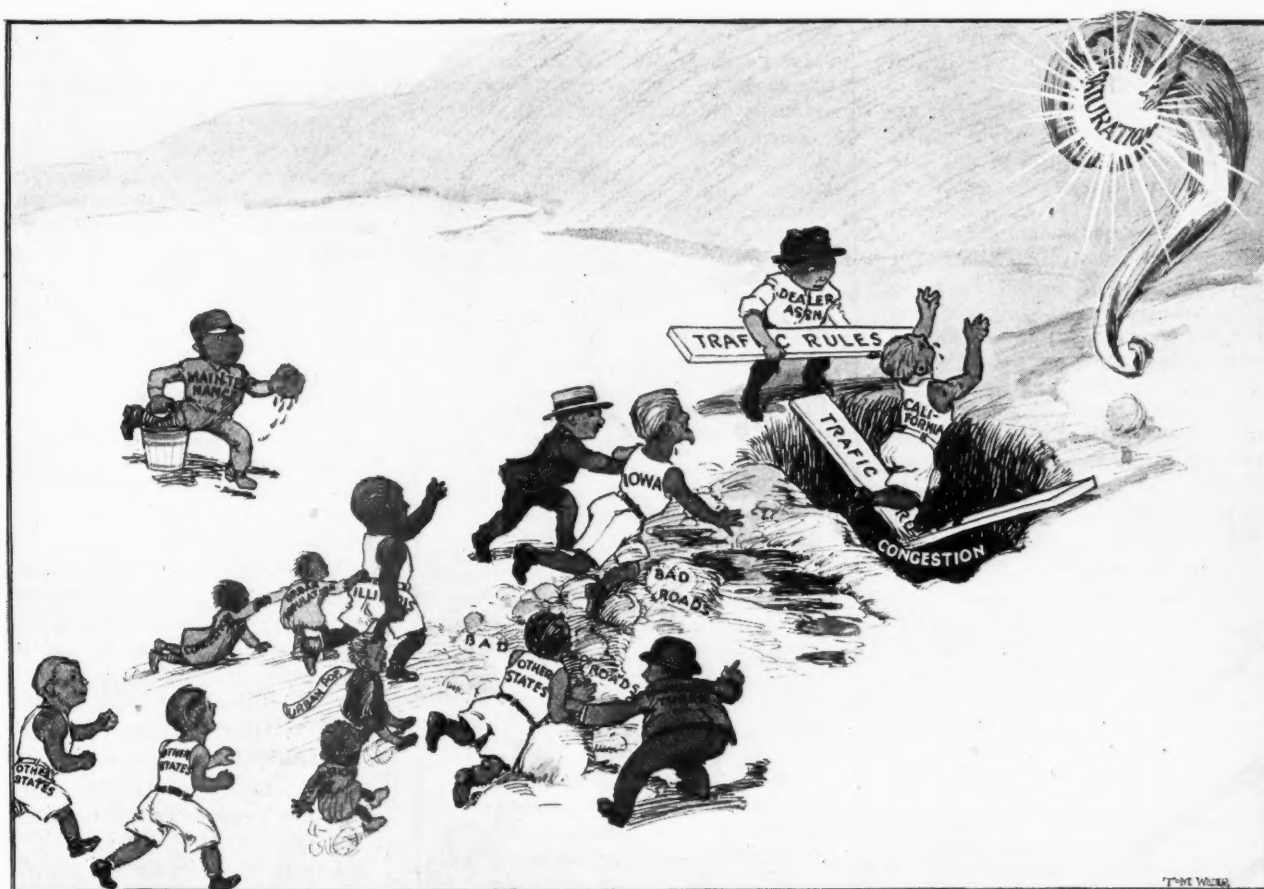
MAXWELL MOTOR SALES CORPORATION, DETROIT, MICHIGAN  
CHRYSLER MOTOR CORPORATION, DETROIT, MICHIGAN  
MAXWELL-CHRYSLER MOTOR COMPANY OF CANADA, LTD. WINDSOR, ONT.

# The Chrysler Six

*Pronounced as though spelled, Crf-sler*

# MOTOR AGE

## The Pursuit



**H**ERE we have an artist's conception of problems related to the rapidly growing motor vehicle registration. The registration as of July 1, 1924, was 15,523,898 and the Census Bureau predicts that in 1950 it will be 38,000,000. If the United States should have so many machines in operation there **MUST** be much better roads and there **MUST** be commensurate traffic control, all established in advance of emergencies. The various states, as motor car buyers, are presented by Mr. Wilder in this drawing as being in pursuit of the enigmatical vamp, **SATURATION**, each state, apparently determined to obtain a husky share of the distribution. You will note, though, that the road possesses many hindrances which **MANUFACTURER**, **DEALER** and **MAINTENANCE**, for good business reasons, are trying to help them overcome. The cartoon stresses the necessity of preparing for the inevitable business expansion that is to come. Read the article which begins on the following page.



# Dealer and Maintenance Field Expands As Nation's Registration Grows

*How Number of Cars in Use Vary in Different States—Possibilities of Future Increases—America's Problem With 38,000,000 Units on Roads*

By CLARENCE PHILLIPS

**F**UTURE possibilities, with relation to the automotive industry's development and the public's prospective absorption of the industry's products, constitute a subject of continuous widespread interest. Many who are close to the industry find themselves repeatedly analyzing new statistics, rechecking old statistics and studying conditions—and on the basis of conclusions reached drawing pictures of what it seems later months or years should bring to pass.

Peering into the future in this fashion is a most engaging occupation when the visualization relates to the particular pursuit you are following, regardless of what your business is. When this future sketch has to do with the motor vehicle it commands the attention of people generally, for where is the man who would not like, at least, to imagine to what limits this great revolutionary force in transportation eventually will lead?

We have seen the motor vehicle bring about many remarkable transformations in a very short space of time and yet we find it still in comparative infancy. The fact that all long-distance prophecies are, at best, only rough "guesses" does not detract from their appeal and while we have seen numbers of them in print the numbers still to come will be received with sharpening rather than diminishing appetite.

## A Government "Guess"

One of the interesting estimates of recent weeks as to the nation's future individual ownership of motor vehicles was made public by the Census Bureau. The "guess" of these experts was that by 1950 registration of cars and trucks in the United States will have reached 38,055,000. It also was estimated that by 1950 the population of the country will be 150,000,000. The Census Bureau, therefore, puts the ownership ratio of 1950 at 3.9 persons per car.

To reach that total and ratio it will be necessary to add 22,531,102 units to the latest registration total, which addition, spread over a period of 26 years, will call for an average annual expansion of more than 866,000 units. While this is much less than the present average annual registration increase (it was 2,753,802 in 1923) there may be some who fear that this 866,000 pace can not be maintained for the next quarter century. We will leave them to their own speculations.

It is recalled that Colin C. Campbell, well known automotive sales executive, who lives close to statistics, ventured in an address in New York not long ago

that the country's registration will be around 25,000,000 within four or five years. That also sounds enormous, yet if registrations hold an expansion average of 2,000,000 for the next five years we will see Mr. Campbell's total written in

the records. There is more reason to expect maximum registrations the next few years than to expect a curve downward. As later years wear on it is logical to look for recessions, while if the growth will continue at the rate of 866,000 units a year for the next 26 years the industry is in for a long period of good health.

When registrations begin to decline in annual expansion volume the industry will adjust itself to the new conditions with increasing attention to replacements and maintenance.

These prognostications all seem more plausible when we stop to consider the rapid growth of motor traffic up to now and its inevitable position in transportation of the future. Motor car ownership in America already has developed at an amazing rate and it may be expected that the pace will continue indefinitely to a measurable extent. Expansion will have its ups and downs, but the tendency will be to continue with a swift, healthy upward net until that mysterious stage called "saturation" requires a slowing down.

Dealers of the present generation will not live to see such a day.

## Growth of Registrations

Since 1895 registrations have ascended from 300 units to a total of 15,523,898, which was the registration on July 1, this year. Since 1913 when the million mark first was passed and before annual production had reached a half million, the growth has been from 1,258,062 to the figure above set forth. In 1918 the registration total was but little more than six million, while the present registration is almost fifty per cent above that tabulated by the Census Bureau for 1921.

All of which shows direction. Now to carry the proposition into another avenue.

Analysis of the latest registration statistics showed that California has one motor vehicle today for every 3.2 persons. In other words, each individual of a third of the state's population could be supplied with one motor vehicle from the present owner stock. Were this the average for the United States generally, based on the 1920 Census, there would be about 35,000,000 motor vehicles in owner operation right now. That is not so far behind the government's 1950 forecast.

California, of course, is an exception to the rule, but it should be remembered that California's low ownership ratio has not always been on the books. Her ratio,

## Number of Persons Per Vehicle July, 1924

California .....	3.2
Iowa .....	4.3
Nebraska .....	4.8
Nevada .....	4.8
Kansas .....	5
Washington .....	5
Oregon .....	5.1
Indiana .....	5.2
Michigan .....	5.2
South Dakota .....	5.2
Colorado .....	5.3
District of Columbia .....	5.3
Ohio .....	5.3
Minnesota .....	5.4
Wyoming .....	5.7
Wisconsin .....	5.8
Florida .....	6.2
North Dakota .....	6.5
Delaware .....	6.6
Vermont .....	6.7
Illinois .....	6.9
New Hampshire .....	7
Utah .....	7.1
Massachusetts .....	7.2
Missouri .....	7.2
Maine .....	7.4
Oklahoma .....	7.4
Idaho .....	7.5
Texas .....	7.5
New Jersey .....	7.8
Arizona .....	7.9
Connecticut .....	8
Rhode Island .....	8
Pennsylvania .....	8.4
Maryland .....	8.6
Montana .....	9
New York .....	9.3
North Carolina .....	9.5
West Virginia .....	10.3
Virginia .....	10.5
New Mexico .....	10.6
Kentucky .....	11.5
South Carolina .....	12.6
Louisiana .....	12.9
Tennessee .....	14.5
Arkansas .....	15.7
Mississippi .....	15.7
Georgia .....	17.2
Alabama .....	18.3
United States .....	7.2

as in the case of all other states, has been steadily diminishing.

But, it might be advanced, that California is a great outdoor state where people go from all parts of the country for the season and for pleasure.

No doubt this accounts for a large share of California's automobiles—but how about Iowa? That is not an outdoor state, so to speak. Iowa is regarded more strictly as a farming state—and its ratio of persons per car is 4.3, second in the list to the great pleasure ground of California.

And, how about Nebraska, another

farming state, with a ratio of 4.8 persons per car, which stands third in the list?

And how about Kansas, with its ratio of 5, and Washington with its ratio of 5?

Here are some registration facts:

The number of persons per motor vehicle in 20 of the states is under 7, with the average for the United States generally being but 7.2.

Registration tables as of July 1, 1923, gave the United States an ownership ratio of 8.5 persons per car.

Registration tables as of July 1, 1922, gave the United States a ratio of 10.16 persons per car.

Registration tables as of July 1, 1921, gave the United States a ratio of 11.4 persons per car.

#### States With High Ratios

Note the downward tendency. There are a number of states with relatively high ratios. Alabama, for example, at the bottom of the list, has 18.3 persons per motor vehicle; Georgia has 17.2, Mississippi 15.7, Arkansas 15.7, the same, Tennessee 14.5, Louisiana 12.9, South Carolina 12.6, Kentucky, New Mexico, Virginia, West Virginia and North Carolina, between 9.5 and 11.5.

These are southern states, most of them with large negro populations which are more or less out of the automobile market.

Yet New York's ratio is 9.3, Pennsylvania's 8.4 and Illinois, 6.9. The answer offered for this from one source is found in the large urban centers where unusual congestion and unusual traffic difficulties keep many persons out of the automobile market. Perhaps.

Many reasons might be ventured to account for these standings and discrepancies, but it is apparent that none of the numerous contributing factors would suffice for a satisfactory explanation.

Even good roads, of themselves, are not sufficient to keep the ownership ratio at a low point. That they are very important in motor traffic development there is no doubt, yet statistics on surfaced road mileage, outside of cities and towns, show that states with low ratios of persons per car are not necessarily leading states in surfaced rural roads.

#### Low Ratios and Good Roads

California, which has the lowest ratio of persons per car is eleventh in the list of surfaced road mileage.

Iowa, with 4.3 persons per car, is 34th in the list.

Nebraska, with 4.8 persons per car, is 45th in the list.

Nevada, with 4.8 persons per car, is last in the list.

Good roads still are in an early stage of evolution in this country. They are essentially a response to traffic demand and consequently we observe that there are several states with exceptionally congested communities near the top of this list.

They will come to the various states in proportion to the vehicular emergency and in proportion to the spirit of community progress, these better roads, but

in the later shifting of rankings it will be seen that they have come first to the states and localities that needed them worst. Communities centering about great cities will take the lead. They are doing that now. Motor transportation from rural districts has become an important feeder of urban industry.

Iowa, Nebraska, Nevada and Kansas do not feel the demand that is felt in states contending at present with much greater congestion. They have more elbow room for traffic and until they feel the crowd and the jostle, with attendant highway

(Continued on page 37)

#### Table Showing State Ranks in Surfaced Roads

(Outside of Cities and Towns)

Jan. 1, 1923

State	Miles	Rank
Indiana	40,214	1
Ohio	37,272	2
Wisconsin	21,627	3
New York	20,209	4
Michigan	19,756	5
Georgia	19,060	6
Minnesota	18,981	7
North Carolina	18,870	8
Texas	16,936	9
Kentucky	16,039	10
California	15,263	11
Pennsylvania	14,863	12
Washington	12,871	13
Illinois	12,435	14
Alabama	10,778	15
Tennessee	10,604	16
Oregon	9,028	17
Missouri	8,345	18
Virginia	7,856	19
South Carolina	7,456	20
Florida	6,876	21
New Jersey	6,824	22
Massachusetts	6,811	23
Mississippi	6,357	24
Colorado	6,230	25
Arkansas	4,743	26
Maryland	3,835	27
Vermont	3,693	28
Idaho	3,597	29
Louisiana	3,527	30
Maine	3,302	31
Utah	2,987	32
Oklahoma	2,648	33
Iowa	2,617	34
Connecticut	2,373	35
New Mexico	2,100	36
Montana	1,901	37
New Hampshire	1,837	38
Arizona	1,646	39
West Virginia	1,558	40
Kansas	1,372	41
South Dakota	874	42
North Dakota	858	43
Rhode Island	840	44
Nebraska	656	45
Wyoming	578	46
Delaware	520	47
Nevada	249	48

#### Numerical Gains and Losses in Car and Truck Registration, July 1, 1923, to July 1, 1924

	Gains
California	249,190
Ohio	185,000
New York	177,262
Pennsylvania	166,325
Illinois	152,560
Michigan	140,454
Massachusetts	101,038
Indiana	98,897
Texas	89,968
North Carolina	75,600
New Jersey	75,317
Washington	65,871
Missouri	64,719
Minnesota	57,552
Wisconsin	55,517
Oklahoma	55,000
Iowa	52,130
Virginia	44,708
Kentucky	39,000
South Carolina	36,196
Connecticut	34,850
Alabama	34,317
Florida	34,107
Louisiana	33,000
Nebraska	32,592
Kansas	29,095
Mississippi	28,425
Oregon	27,744
Georgia	27,100
West Virginia	24,691
Tennessee	20,170
Colorado	20,113
Arkansas	18,936
Maryland	18,372
Rhode Island	13,206
Utah	13,132
New Hampshire	11,936
Maine	11,000
New Mexico	10,659
Idaho	9,901
Arizona	8,383
Delaware	8,700
Vermont	8,001
South Dakota	7,369
Montana	5,150
North Dakota	3,824
Nevada	3,229
Wyoming	3,047
	Losses
District of Columbia	7,588
Gains	2,483,353
D. C. Loss	7,588
Total Gains	2,475,770



# Decentralization of Industry Under Way, Says Henry Ford

*Pointing to His Own Factory Villages That Have Been Profitably Established Detroit Leader Predicts End of Great Cities*

*What effect would decentralization of industry have upon the country's business system? More interesting still, to MOTOR AGE readers, what effect would it have upon the automobile trade—the dealer, the repair shop and other vital components? These questions are not inappropriate, for in the following article Henry Ford not only predicts that decentralization is to be a factor of the future, but that it already has begun.*

*Mr. Ford has not been alone in the decentralization theory. Notable among its proponents was the late Charles P. Steinmetz, a close friend of the automotive industry. Dr. Steinmetz, thinking largely of electrical development, based his argument upon the influence of economic convenience. Mr. Ford treats the subject broadly from the standpoint of economic necessity. The two lines are practically parallel.*

*Assuming that Mr. Ford's prophecy will come true we can visualize an automotive field vastly broader and more important in its relation to public service and the trade than that of today. It would swing into gigantic proportions with increased demand for adequate highway traffic accommodations. With production and population decentralized it would be logical to expect retail sales and maintenance in rural sections to expand apace, creating a countryside thick with automotive tradesmen and their various establishments. A fanciful picture, you might say, yet it is a reasonable extension of the thought advanced in the accompanying article by Mr. Ford. And Mr. Ford says decentralization has commenced.*

BY DREW PEARSON

IN THE America of the future there will be no New Yorks or Chicagos or other mammoth collections of skyscrapers and teeming tenements in which millions of people are cooped within a few square miles of territory. Instead, the country will be traversed by chains of small towns clustering around individual factories and inhabited by people who will divide their time between factory and the farm.

This is the vision of the future which was painted for me by Henry Ford in a remarkable interview in which he predicted the rapid decentralization of industry; asserting that decentralization has been actually in progress for some years now and nowhere with more remarkable or striking results than in the case of the huge enterprise which is headed by the wizard of the automobile industry. The picture of the America of tomorrow which Henry Ford paints is a particularly rosy one. In his opinion the passing of the big city will mean less crime, less poverty, less wealth, less unrest, and less of that fierce, nervous strain under which myriads of our city dwellers live today.

"The modern city has done its work and a change is coming," said Mr. Ford. "The city has taught us much, but the overhead expense of living in such places is becoming unbearable. The cost of maintaining interest on debts, of keeping up water supply, sewerage and sanitary systems, the cost of traffic control and of policing great masses of people are so great as to offset the benefits of the city. The cities are getting top-heavy and are about doomed."

"When you speak of the decentralization of industry, do you mean that the present great industrial combinations will split into small individual units?"

## Limited Concentration

"On the contrary," replied Mr. Ford quickly. "Industry in the future is going to be organized on a big scale. Competition, however, will force big industry to move its various parts to the country where labor is steady and overhead costs low. They have got to come around to it. We used to believe that it was necessary to concentrate industry, but I maintain that industry must decentralize. Certain heavy industries, of

course, must be concentrated, but in others which involve the making of numerous small parts, these parts can be manufactured just as easily 40 miles from the assembling plant as in connection with it. In our own Highland Park plant we first cut down the cost of production by taking the work on an endless chain to the man. Now we go one step further. Instead of having the man come to the city we take the work out to him in the country. Improved transportation methods have made that possible and the process will become steadily more feasible as transportation facilities grow.

"At the same time," continued Mr. Ford, "it is nonsense to say that because the cities are overcrowded everybody ought to move to the farm. There must be a balance between the two. The farm has its dull season, when the farmer can come into the factory and the factory has its dull season when the workman can get out on the land to help produce food. Transportation is the connecting link."

I asked Mr. Ford to tell me exactly what he, himself, had done in the way of decentralization in his own great industry. For reply he said:

"Go out and see for yourself. Go into the country and visit some of our village factories where we are manufacturing small parts. We have been doing some experimenting. We have moved small plants to the country, taking some of our people out of the city and employing farmers in the villages. In the summer time water is low, orders are a little slack and we let the farmer workmen off to do their harvesting. Take a look around and see for yourself how they like our experiment."

## A Trip to the Villages

I accepted his invitation and made a trip through rural Michigan, where I visited Ford's village factories and talked to foremen and farmers about his plan for taking industry out to the country.

The River Rouge is a mud creek wandering lazily down to Detroit past half a dozen old mill sites which once ground the grist of the countryside. Today, reharnessed by new concrete dams, supplying power to modern turbines in clean white fac-



tories, the River Rouge is grinding out carburetor valves and generator cut-outs and magneto parts for Ford cars the world over.

The first of these factories located at Nankin, a metropolis of 14 houses, employed 11 men—incidentally, a substantial majority of the male population is making 103,500 vibrator-cushion-spring-spacer-rivets a day. The Rouge at this point gave only 15 horsepower, but a few miles farther up at Plymouth, a larger dam supplied 100 horsepower and employed 33 men. Phoenix, with 150 girls, and Northville employing 380 men, complete Ford's village industries on the Rouge.

The Ford plant at Nankin was originally an old grist mill and Mr. Ford has insisted on retaining the old oaken beams with their wooden pins instead of nails and the old barn door with its huge lock. Men employed there are working four days a week, which gives them time to attend to their farms and also to save up water, which is low in the summer time. The superintendent lives in an old farmhouse which has been modernized while preserving its colonial aspect. Trucks from Detroit bring out the raw material to this as to the other village industries on the Rouge and carry back the finished material, a form of transportation which has proved inexpensive.

#### A Foreman's Version

At Plymouth, where 33 men are employed, the foreman gave me a very enthusiastic account of how the plan was working with respect to the farmer mechanic. "There's Frank," he said, "with 22 acres. I gave him a day off last week to cut his hay. There's Jim, with 17 of the prettiest acres of farm land you ever want to see. I was up at his farm last Sunday with the wife and kids. Went all over the place. He is tickled to death to have a day or two off these slack times to pick his berries. There's Bill Coogan, with only six acres, who is raising squabs, and Sam Stewart, with a five-acre patch. Not so big, as farms go, but it gives them something to fall back on and the kids a great place to be brought up, while the wife has plenty of green vegetables. After all, who would want a finer place to work? Look at that fine, clean building, a lake in front—good swimming—this green grass, trees, shade, birds and that line of Fords in the rear to show how prosperous our factory hands are."

At Northville valves are manufactured in what once was the biggest church furniture factory in the world. In the last three years 44,000,000 valves have been sent by truck from Northville to Detroit and the cost of manufacture has been cut 50 per cent. Previously the making of these parts meant the transporting of 380 men daily from their homes in Highland Park. The people of Northville were not enthusiastic when Ford first moved there. The business men said that prices and wages would be forced

up, but Mr. Ford was careful not to take employes from other Northville industries, but to get his recruits from the unemployed. As a result everybody in the town now has work and the merchants are Ford boosters, for their bills are paid and property is rising.

#### Six Months Residence Rule

There are long waiting lists in each village of people who want to get employment in the Ford shop and he gets



*As Henry Ford looks today*

many inquiries from Detroit families who want to move into the country. These letters have not been encouraged, however, as Mr. Ford wants to serve the village people and will only employ those who have lived in the respective village for at least six months. He is working slowly so as to make sure how the plan works out before he develops it further. At present there are four village industries in active operation, while three others, at Waterford, Newburgh and Beals, are being planned.

At all of the plants in operation foremen and workers told the same story.

"I wouldn't go back to the city for twice my pay here," one man said, "and my wife wouldn't go back for three times as much. We have got a truck garden and a cow, the kiddies are outdoors all day long, and only have to go around the corner to school. And say," he waved toward the mill reservoir whose blue depths reflected the clean concrete of the factory and its surrounding grove of green, "who could want a more beautiful place to work?"

"How have the farmers taken to Mr. Ford's new idea?" I asked one foreman.

"Well, we've lots of 'em working here, paying off their taxes and mortgages. They figure \$6 a day for eight hours here is a vacation compared to 12 hours on the farm for an uncertain income. But our men are not heavy farmers. They have about 25 to 50 acres. It is pretty hard for a man to manage a big tract of land after working all day at a machine. During low water, we've been working only four days a week, and most of the boys were tickled to death to get the extra day in the fields."

#### No Longer Strap-Hanging

"The chief thing that Mr. Ford has done," concluded another, "is to bring the city worker out to the country. A lot of us used to commute all the way from Northville to Detroit. Now, instead of hanging to a strap twice a day, I walk across the street to work."

The foremen all agreed to one other point, equally important. Cost of production, since they had moved to the country, had been cut at Phoenix by 18 per cent, at Plymouth 33 per cent, at Nankin and Northville 50 per cent. Why? I'll let Mr. Ford explain that in his own words.

I put the astounding cost reduction up to him when I returned to his Dearborn office.

"When we made those particular parts at our Highland Park plant," he explained, "we did it in departments which were more or less insignificant cogs in a great industrial machine. When we moved these plants out into the country they became individual factories. The foremen became heads of factories. The workmen took pride in the place. They lived there.

"But most important of all, labor turnover was cut down. In a big city labor is performed by transients, usually single men. They come and go, and it costs a lot to break them in. Out in the country we can employ married men, who own their own homes, and are with us the year round. They become skilled workmen. Here, take a look at these figures. They tell the story better than I can."

Mr. Ford handed me a typed sheet upon which the cost of producing valves at the Highland Park plant in 1920 was estimated at 9½ cents. At the Northville

plant in 1923 they showed four cents. A closer scrutiny of the sheet showed that when the plant was first moved to Northville, the time required for producing each valve was 3.5 minutes. Later, as

the skill of the workmen improved production time stood at 1.26 minutes.

#### Spoonfeeding Not the Idea

"Do you intend to build any model towns in conjunction with your village factories?" I asked.

"No, I am against that sort of thing. I believe that if people want to get things done, they can do them themselves. Cooperate with them, but don't hamper them. They get spoonfed.

"Take that first village you visited—Nankin. Only 14 houses, but they are putting in their own sewerage and electricity. And they are not borrowing a lot of money to do it. Why not? Because they are getting good wages every day, living cheaply on their lands and can afford these improvements. We are helping them, of course. We furnish electricity free and their water. But they are doing most of it themselves, even to the extent of digging a well for one old man who is 72 and can't work.

"At another village, Flat Rock, we put in a dam which serves as a bridge for the Detroit, Toledo and Ironton railroad, also as a road for the public, and holds back enough water to run our glass mill and to supply the local demand. Before we built our water works, we had a town meeting and made a proposition to build a reservoir large enough to supply the entire town, if the local people would foot a certain per cent of the bill. Except for one vote it was unanimously adopted, and we put up a water works with a capacity of one million gallons,

which will take care of the town's expansion for 15 years, even though its population has already increased 300 since our plant went up."



Morning exercise, we would surmise. Anyhow, here is Mr. Ford out to demonstrate his prowess with an ax

#### Henry Ford Says—

*Decentralization has been actually in progress for some years.*

*The modern city has done its work and a change is coming.*

*Competition will force big industry to move its various parts to the country where labor is heavy and overhead costs low.*

*Instead of having the man come to the city we take the work to him in the country.*

*At the same time it is nonsense to say that because the cities are overcrowded everybody ought to move to the farm. There must be a balance between the two.*

## Used Car Losses Decline but Menace Has Not Disappeared

OFFICIALS of the National Automobile Dealers have recently completed the used car survey for the second quarter of 1924 and dealers' losses on used cars show a slight increase over the losses for the first quarter, the figures being \$6,049,600 for the first three months and \$6,327,475 for the second three months, a total for the half year of \$12,377,075.

#### Losses Less in 1923

Losses in 1922 amounted to more than \$123,000,000 and in 1923 the losses were \$66,000,000 less and in the last quarter of 1923 amounted to \$6,810,000, showing that the losses are steadily declining.

But officials of N. A. D. A. point out that these losses can be even further curtailed, and the analysis of the figures contains a warning that if dealers look upon these reduced losses as indicating a menace too small for further worry, carelessness and slackening of efforts on used cars can very quickly bring about the former conditions that caused excessive losses. In 1922 the dealers handled more than a million used cars. They have handled more than twice that many in the first six months of 1924.

#### Pleasing Buyer Attitude

During the first six months of 1924,

members of the executive staff of N. A. D. A. were constantly traveling, studying, asking questions, watching trade developments and conditions, and one thing which impressed them most was that dealers everywhere were greatly relieved at the changed attitude of the 1924 car owners and buyers, the buyers were fast awakening to the menace for them in buying from a dealer who made an excessive allowance to swing a deal.

#### Guesswork Is Dangerous

Experience of dealers for the last three years shows that the dealer who handles the used car on guesswork and without accurate information suffers heavy losses while there are hundreds of dealers scattered all over the country who are handling used cars at a profit.

Other experiences have proved that nearly every co-operative effort on the part of dealers has failed to live for any length of time. There has been repeated proof throughout the last three years that dealers cannot by agreement or combination use the services of any single individual for doing the work of individual businesses.

#### Using Old Principle

The conclusion reached by N. A. D. A. officials and which has been propounded

by them is that dealers who are successful in handling used cars are using the old merchandising principle which is that in order for a dealer to show a fair profit on used cars he must have a 20 per cent margin of gross profit, some dealers have tried 10 per cent and others 15 per cent. One notable example of that margin of profit is the used car merchandising formula distributed this year by one factory to its dealers, that organization has been studying dealer costs and methods for some years and its formula is based on the experiences of all of its dealers large and small and it may be able to handle the used car profitably on that basis. It proved that a profit is possible when the used automobile is traded on an allowance that has been arrived at by merchandising methods.

#### Losses Are Cut

The N. A. D. A. report closes with the statement that dealers who have applied N. A. D. A. methods to their business have cut used car losses \$80,000,000 off used car losses within 18 months and points out that one ten-thousandth part of one per cent of that amount is more than the average annual dues paid by



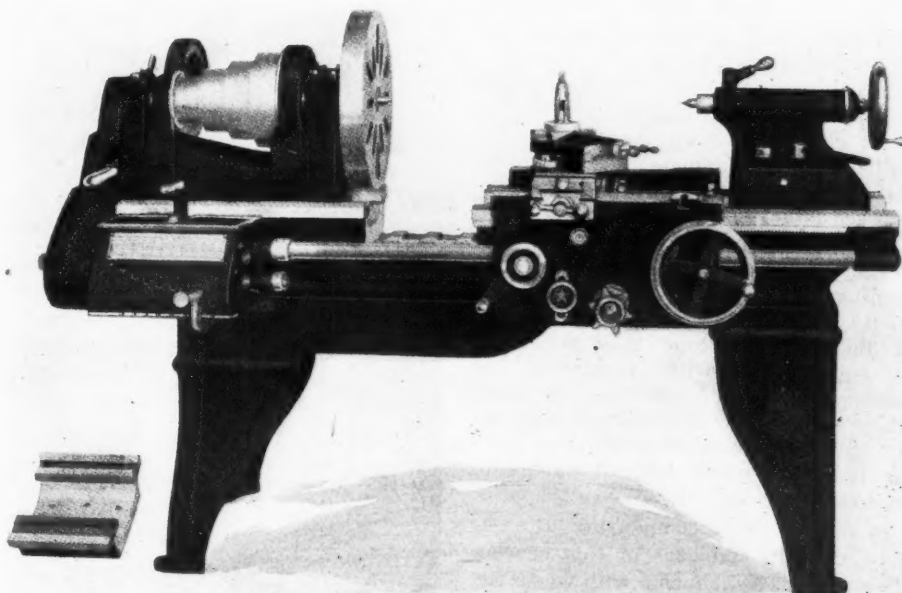
# Further Advantages of the Lathe in the Automotive Shop

*The Second Article of a Series on Buying and Using Equipment to Good Advantage. In This Article Other Uses of the Lathe Are Cited. Gap Bed Lathe Desirable for General Work*

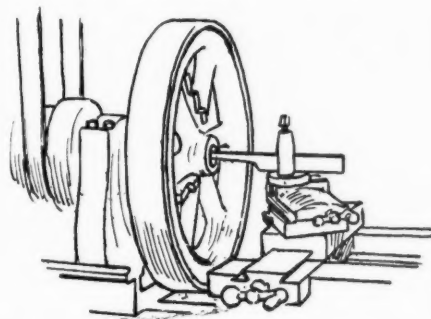
BY B. M. IKERT

AS was pointed out in the article on page 18 of the August 14 issue of MOTOR AGE, a lathe is a most necessary tool in the general shop where a great variety of work is handled. In the smaller communities and in towns quite some distance from large cities the automotive shop in addition to its general line of work is called upon constantly to perform operations which in a sense belong to the full-fledged machine shop. To that end the lathe can be used to advantage.

It also was pointed out in the first article on the lathe as a profitable investment for the automotive shop, that this tool could be used to good advantage particularly in the making of bushings. No matter how complete a stock of parts is on hand there are almost daily calls for bushings that are not in the parts bin. It may be a case of a farmer who has a tractor working in the field and who cannot afford to keep the machine idle for a lengthy period. He wants an immediate repair if he can get it. Without a lathe the service man or shop man must tell him that he will have to



*A typical gap bed type of lathe. The bridge shown at the left is used to fill the gap when the lathe is used as a straight bed type. The swing over the straight bed of a 15 in. lathe can be increased to about 22 in. by removing the gap bridge*



*Here is shown an example of the handiness of the gap bed type of lathe. It permits of handling work of a very large diameter. In the above instance a large flywheel is being bored out prior to bushing*

wait until the part is sent for. If a lathe is available it is only a matter of a short time to turn up a bushing, or whatever the part may chance to be.

But aside from the matter of bushings, consider what other operations the lathe may be used for. Take the matter of sharpening and grinding reamers. Reamers are used in the automotive shop probably as much as any hand tool and it is necessary, of course, that these reamers be kept in the proper working

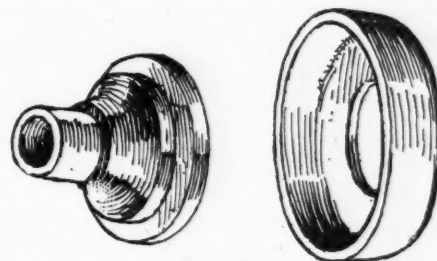
condition or they do not function. Grinding the cutters of a reamer is a real trick and if a good job is wanted and the shop has no facilities for sharpening these tools they usually are sent to the reamer maker or to a shop properly equipped to do the work.

When the lathe is supplemented with a grinding attachment the sharpening of reamers becomes a relatively easy matter because the reamers can be held between the centers of the lathe and the cutting wheel brought to the correct angle by means of the base secured to the lathe carriage. Reamers which are used for valve seats can be sharpened with a lathe grinding attachment, as the same setting can be used for sharpening the valve seat reamer as is used to grind the face of the valve.

Investigation seems to indicate that the ability to maintain proper cutting edges on tools such as reamers is one of the decided advantages of having a lathe in the shop. It must also be realized that the ingenuity of the shopmen counts for much when it comes to the versatile use of the lathe. Many shops have special fitments made for the lathe which make possible many unusual operations. Such fitments in many cases are in the

form of holding devices which make it possible to turn complicated jobs in the lathe. Turning the spindle of a steering knuckle, for example, calls for some ingenuity in holding it so it will be centered properly.

The matter of special jobs for the lathe brings up more or less the subject of the gap bed type of lathe. Reference to the gap bed lathe was made in the pre-



*A cup and cone which can be made by means of a lathe. Many similar jobs of an unusual nature can be handled on the lathe*

vious article, but this was particularly devoted to the question of difference in prices between the straight and gap bed type of lathe.

The automotive shop, especially the one working on all makes of vehicles and



## New Chevrolet Models Announced

doing a variety of other work, will find the gap bed lathe a decided advantage. This will become at once apparent when it is known that a gap bed lathe ordinarily having a swing of say 15 in. over the bed can, by removing the bridge in the bed, increase this swing to something like 22 in. Other gap bed lathes are made with a sort of U-shape in the bed. Such lathes usually are made also with very substantial legs because owing to the absence of a straight bed the parts have to be made larger and stronger to obtain the necessary rigidity.

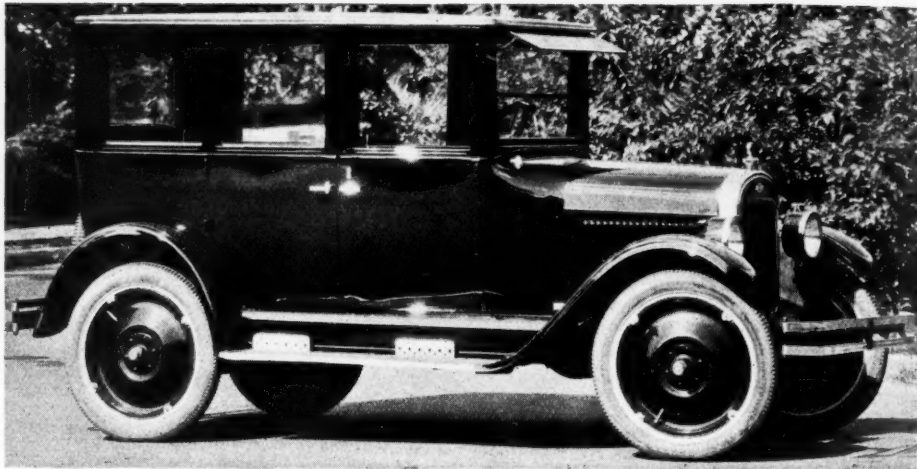
Every now and then the general shop has to do a lathe job on a large pulley or flywheel and for such work the gap bed lathe is a decided advantage. To show the advantages of a gap bed lathe a case is cited here of one shop recently visited. This shop had quite a run of work on cutting down wood wheels for balloon tire equipment and naturally this work was admirably suited to the gap bed lathe.

To illustrate further the desirability of having a lathe in the automotive shop mention is made here of a recent case where a customer brought in a bearing of the cup and cone type, which he wanted to replace with a new one. This bearing had been taken from the front wheel of a rather old model passenger car and it was impossible to get a similar type of bearing without having to wait several days.

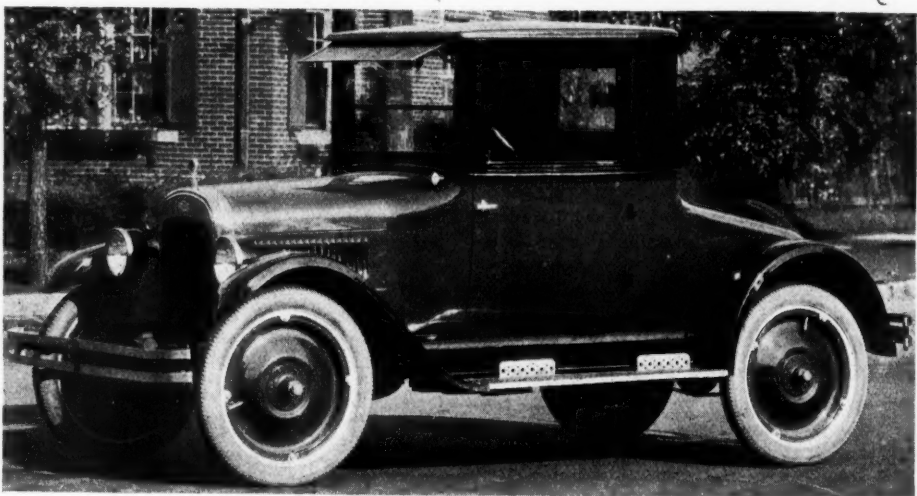
In one of the accompanying illustrations the cup and cone of this bearing are shown. The shopman with whom the customer talked readily saw that the job was one that could be handled on the lathe. In very short order he had turned up a cup and cone and replaced the steel balls with new ones. To the customer it meant a great deal to be able to get this work done and to the shop it meant good will, advertising and profit.

The above lathe job brings up a subject, which ought to be a part of lathe work and that is the ability to case harden small parts. The cup and cone, for instance, had to be case hardened after they were machined on the lathe in order to resist wear. It so happened that this shopman was able to case harden small parts and, inasmuch as this is not a very difficult operation, it can quickly be mastered by most mechanics. In most cases, anyway, the man who operates the lathe is a pretty good all-around mechanic and understands the tempering of steels, annealing and case hardening. It is common for most lathe men to make their own lathe tools and in this hardening plays an important part.

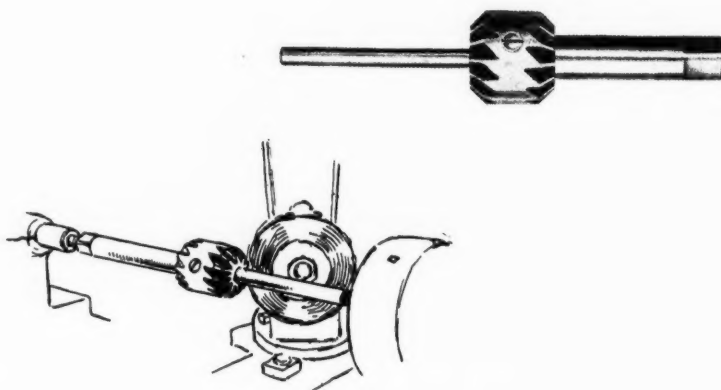
As one man who operates quite a well equipped shop expressed it "With the lathe you can do anything, that's why we have one." Most of the other automotive shops in that town bring in their work which calls for machining operations on a lathe to this shop.



*The Chevrolet de luxe sedan which is finished in gray Duco below the belt line and black above*



*Here is shown the Chevrolet de luxe coupe, the price of which is \$775*



*It is practically impossible to grind reamers without proper facilities. The lathe is a most useful tool for this purpose. All forms of reamers can be ground. Here is shown a 45 deg. valve reamer being ground*

# 1925 Willys-Knight Engines Equipped With Lanchester Harmonic Balancer

*Changed Port Timing and Higher Compression Have Produced Greater Torque at Low Engine Speeds*

**A**LL Willys Knight engines are now being equipped with Lanchester balancers which automatically neutralize the unbalanced forces present in a four-cylinder power plant thus reducing vibrations caused by reciprocating parts to a minimum. The device is being installed by an arrangement with its inventor, Dr. F. W. Lanchester, a well known British engineer. The performance of the car has been further improved by changes in the valve timing and compression which have increased the torque output of the engine at low speeds with the result that the car accelerates more rapidly.

Semi-balloon tires have been made regular equipment on all models. On the open cars, the tire size is 33x4.95 in. and on the closed 33x5.77. Full balloon equipment consisting of five 32x6.20 tires and five disk wheels are offered as an option at an additional cost of \$100 on the standard open models and of \$80 on all others. Prices as given in Automotive Industries of August 14 include the new tire and balancer equipment.

To test the effectiveness of the device, the writer rode first in a car that was not equipped with a balancer and then in one that was. In the latter case, the performance of the engine compared favorably with that of a six as far as absence of vibration is concerned.

The balancer equipment is in a malleable iron frame which is supported from the crankcase web carrying the center main bearing. It consists of two cylinders mounted side by side with their axes at right angles to the crankshaft. These cylinders are each 3 in. in diameter and 3 in. in length, approximately, and are free to rotate on bronze bushings which are mounted on shafts which are supported at each end in the bal-

ancer frame. On the surface of each cylinder is cut a helical gear with a face width of 1½ in. These gears mesh with each other and consequently when one cylinder revolves, the other turns in the opposite direction. Three holes are drilled through each cylinder in a direction parallel to its axis. As these holes are all located in one half of the cylinder, one of its sides is heavier than the

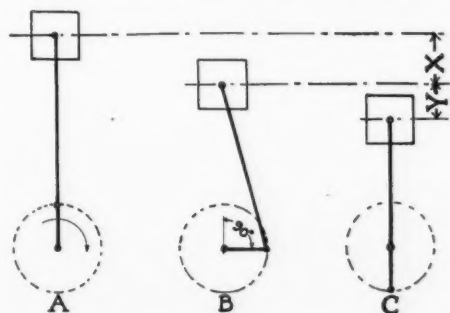


Fig. 1

*Fig. 1—The piston of any reciprocating engine with ordinary crank throws travels further during the first quarter than it does during the second quarter revolution*

other and, when it rotates, the effect is the same as that of a revolving balancing weight.

One of the balancer cylinder gears meshes with and is driven by a bronze, helically cut ring gear about 7½ in. in diameter. Four cap screws and two dowels secure this gear to the short crank arm between the center main bearing and No. 3 crankpin, an extension being forged on the inner end of this arm to provide the necessary diameter. The ring gear has twice as many teeth as the cylinder gears so that the latter rotate at twice crankshaft speed. The rotation of the balancer cylinders is timed so that their heavy sides are verti-

cally downward when the pistons are in the dead center position.

Pressure lubrication is provided for the balancer cylinder bearings. The oil enters the balancer frame on the left side and is conducted through holes drilled in this casting to the balancer shafts which are hollow for a portion of their lengths. Radial holes in the shaft admit the lubricant to the bearings. The gears are lubricated by pick-up of oil trapped in the trough formed by the bottom of the balancer frame. A pressed steel cover is provided for these gears to prevent their slinging oil. For a similar purpose, a baffle is cast integral with the central crankcase web which catches oil thrown off the ring gear.

The balancer equipment adds about 18 lbs. to the weight of the engine.

The location and size of the ports in the valve sleeves have been altered with the result that the ports have a larger maximum opening. These changes have also affected the timing so that the maximum port opening now comes more nearly at the point of maximum piston speed. The compression ratio has also been increased by a reduction in the clearance space from 22.2 to 21.5 per cent of the total cylinder volume. The net result of these changes has been to improve the torque characteristics of the engine at low speeds.

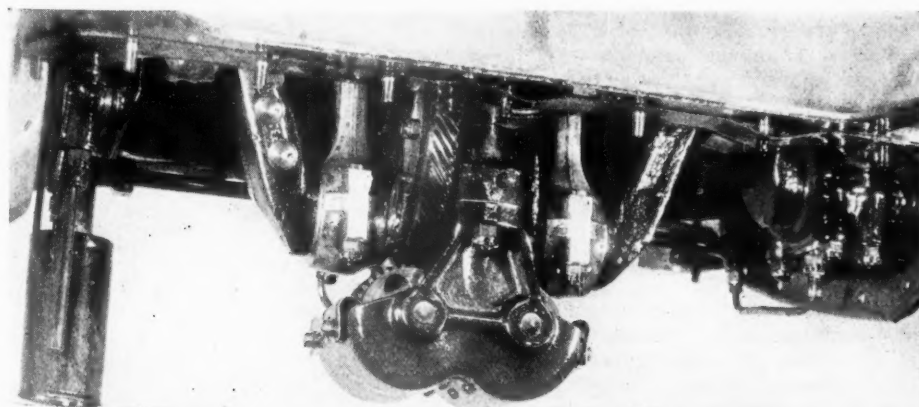
The following gives the new and old valve timing:

New inlet opens 5 deg. after T. D. C.
Old inlet opens 15 deg. after T. D. C.
New inlet closes 40 deg. after B. D. C.
Old inlet opens 50 deg. after B. D. C.
New exhaust opens 45 deg. before B. D. C.
Old exhaust opens 50 deg. before B. D. C.
New exhaust closes at top dead center.
Old exhaust closes 8 deg. after T. D. C.

## How the Lanchester Balancer Functions

Unbalanced forces resulting from the reciprocating motion of the pistons and connecting rods, are one source of engine vibration. The Lanchester balancer minimizes vibration from this cause by setting up counter forces in the engine that are always equal and opposite in direction to the unbalanced forces, and consequently the two neutralize each other. An exact and complete explanation of the operation of the balancer involves the use of considerable mathematics and is too technical to be undertaken here. However, the following explanation together with the sketches will give a reasonably accurate idea of the workings of the balancer:

Consider first a one-cylinder engine. An instant before the piston reaches top



Lanchester harmonic balancer as installed on Willys-Knight engine



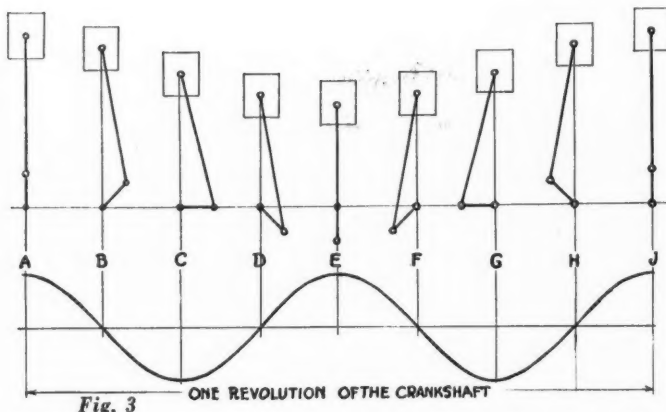


Fig. 3—Piston motion in the two outer cylinders, No. 1 and No. 4. The positions are shown for each 45 deg. of crankpin rotation. The unbalanced secondary forces exerted by these pistons is illustrated graphically on the curve shown

Fig. 4—Position of the Lanchester balancer cylinders for each 45 deg. of crankpin rotation. The sectors in black indicate the heavy sides of the balancer cylinders at each corresponding crank position

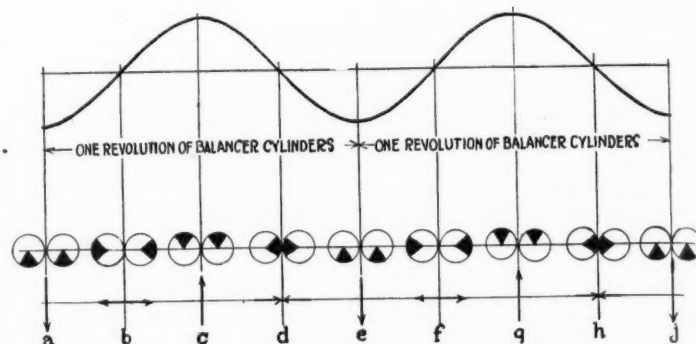


Fig. 4

dead center it is moving upward and, an instant after, it is moving downward. In other words, the direction of piston motion reverses at top dead center, and also at bottom dead center. It is evident, therefore, that the piston must be stationary for an instant in the dead center positions while it is reversing its direction of motion. As the piston moves away from one dead center position, its speed increases, reaches a maximum and then decreases as it approaches the other dead center.

Force must be applied to the reciprocating parts to cause these changes in speed. As the piston approaches dead center, its natural tendency is to keep on moving but it is restrained from doing so by the crankshaft through the connecting rod. In other words, as the piston approaches, passes through and moves away from the dead center position, it exerts a force on the crankshaft through the connecting rod. At top dead center, this force is upward and, at bottom dead center it is downward. In the former case the piston tends to pull the crankshaft up and, in the latter case, down. But the crankshaft cannot move as it is held securely by the main bearings. Consequently these forces are transmitted to the crankcase and thence through the engine and chassis. As they act first in one direction and then in the other, vibration is the result.

In Fig. 2 is shown a diagrammatic four-cylinder engine. It is evident that when the two outer pistons are moving in one direction, the inner two are traveling in the opposite direction. The forces exerted by the outer pistons on the crankshaft is downward as they slow up, stop and speed up in the opposite direction in passing through bottom dead center. While this is taking place, the two inner pistons are passing through top dead center and are exerting an upward force on the crankshaft. If the upward forces exerted by the two pistons passing through the top dead center were equal to the downward forces exerted by the two passing through the bottom dead center, they would neutralize each other and the engine would be balanced. Unfortunately these forces are unequal, and

it is this inequality that the Lanchester balancer compensates.

In Fig. 1, a diagrammatic single cylinder engine is shown. At A the piston is in top dead center position and, at B, the crankshaft has rotated 90 deg. and the piston has moved downward the distance X. At C, the piston is in the bottom dead center position and the piston has traveled the distance Y. The distance X is greater than the distance Y, which means that the piston travels further during the first quarter revolution than it does during the second. And, in the same way, the piston travel in the third quarter (upward) of the crankshaft revolution, is less than in the fourth quarter. The crankshaft, however, is rotating at a constant speed so that the piston travels the distance X in exactly the same time as it moves the distance Y. As the distance X is greater, the piston must move faster during the first and fourth quarters of the crankshaft revolution than it does during the second and third.

Just as it takes more power to accelerate a car from 5 to 25 m.p.h. in 7 seconds than it does to increase its speed the same amount in 10 seconds, so it takes a greater force to give the two pistons in a four-cylinder engine, which are moving downward from top dead center, their higher speed, than it does to give the other two pistons which are moving upward from bottom dead center, their lesser speed. This difference between the two forces is known technically as the secondary unbalanced force to distinguish it from the primary unbalanced forces which neutralize themselves in a four-cylinder engine and consequently do not result in vibration. For the same reasons, the force required to slow down and stop the two pistons approaching the top dead center position exceeds the force required to slow down and stop the two approaching the bottom dead center position.

The diagrams in Fig. 3 may be taken to represent piston motion in cylinders 1 and 4, the pistons in cylinders 2 and 3 moving in an exactly opposite manner. In this figure, the piston positions are shown for each 45 deg. of crankshaft ro-

tation. Below, the wave curve shows the variation and size of the secondary unbalanced forces. Where the curve is below the horizontal line 00, the force acts downward and where it is above, the force is upward. The directions of the forces for each crank position shown, are listed in Table 1.

In Fig. 4, the positions of the balancer cylinders are shown for each position of the crankshaft shown in Fig. 3. The sectors in black show the position of the heavy sides of the cylinders at each crank position. At a, the heavy sides are both vertically downward and consequently the centrifugal force each exerts on its shaft (which in turn transmits it to the balancer frame and thence to the crankcase) is vertically downward as indicated by the wave curve above, the arrow below, the cylinder diagrams. Comparing with Fig. 3, it will be noted that the unbalanced force exerted by the reciprocating parts is directly upward at this instant. At b, Fig. 4, the cylinders have turned through a quarter revolution although the crankshaft has only made an eighth of a revolution. This is because the cylinders are geared to rotate at twice crankshaft speed. At this position, the weighted sides of the cylinders are both horizontally outward and, the centrifugal force of one is directly opposite to that of the other. As the cylinders are duplicates of each other, the two centrifugal forces are equal and consequently neutralize each other. This is

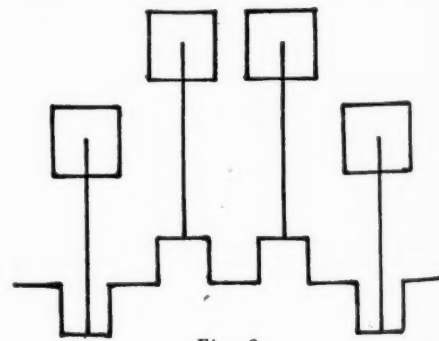


Fig. 2

Fig. 2—The Lanchester device functions to balance the forces exerted by the outer pistons downward against the two inner pistons acting upward



the desired condition as reference to Fig. 3 shows that there is no unbalanced force to be compensated at this instant. At C in Fig. 3, the unbalanced force is shown as vertically downward and, at c in Fig. 4, the balancers exert a neutralizing upward force. At d, the centrifugal forces of the cylinders again neutralize each other. It is evident, therefore, that the balancer cylinders at all times exert a force that is directly opposite in direction to the secondary unbalanced force in the engine and, by proper adjustment of the weight of the heavy sides of the cylinders, the forces set up by the balancer are made equal to them. Consequently the balancer neutralizes the unbalanced forces with the result that they do not produce vibration.

Table 1

Fig. 3

Crank Position	Direction of Unbalanced Force
A	Upward
B	Zero
C	Downward
D	Zero
E	Upward
F	Zero
G	Downward
H	Zero
J	Upward

Fig. 4

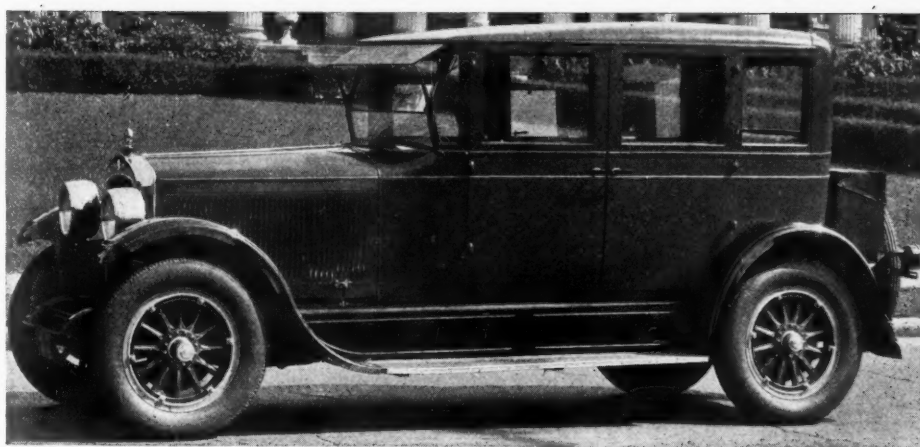
Direction of Force Exerted by Balancer	Position of Balancer Cylinders
Downward	a
Zero	b
Upward	c
Zero	d
Downward	e
Zero	f
Upward	g
Zero	h
Downward	j

## Dealers Consider Weekly Payment Plan

In order to get their money regularly, instead of mere excuses from purchasers of cars on time payments, a number of dealers in Philadelphia are considering the plan of collecting instalments weekly, instead of monthly, the idea behind it being "get your money while they have it." If the weekly collection plan is adopted, it will be taking a leaf from the experience of a few truck dealers and automobile financing companies that have had, in the past, more or less difficulty in making customers meet their payments. As from 75 to 80 per cent of the passenger cars sold in the Philadelphia territory are time transactions, delays in payments constitute a serious drawback to the trade.

This "get your money while they have it" plan undoubtedly would result in fewer replevin proceedings on the part of the financing parties and permit automobile dealers to be more prompt in paying their own bills.

The idea of these automobile men is to



The great Jordan Line Eight Brougham, which is priced at \$2,875, and is one of the new models described in last week's MOTOR AGE

apply the weekly payment method to all their customers and not only to those whose credit standing is somewhat dubious. An instance in the truck selling field, where the plan worked out particularly well, is cited. It was begun in the case of purchasers of debatable credit, but later was extended to all customers regardless of financial standing, and with notably good results.

The truck dealer, however, had no intention of employing a mere \$5 weekly payment method.

### Debtor Pays As He Collects

He started in to collect a proportionate amount of the entire sum due, in weekly, instead of monthly payments. Among his customers were a number of individual motor bus operators, largely foreigners, who, of course, collected their money, regularly each week, but many of whom, if allowed a month in which to make settlements often found themselves without sufficient funds to meet their obligations.

Then there were truck operators, in a small way, who were paid off on Saturday. The dealer saw that his wisest move was to get this money before they had a chance to spend it, or plead the well known "no money" excuse on one pretext or another. He sold about 38 motor buses to the individual operators on the weekly payment plan and, to the surprise of those who had advised against it, he collected every cent due on the vehicles and he has had as favorable results from hauling contractors.

Customers of more stable credit, when told firmly that weekly collections were now part and parcel of his selling policy, did not demur.

### Others Follow Example

Since then, other truck dealers in this locality, profiting by this pioneer's experience, have made a similar step and are satisfied with the outcome.

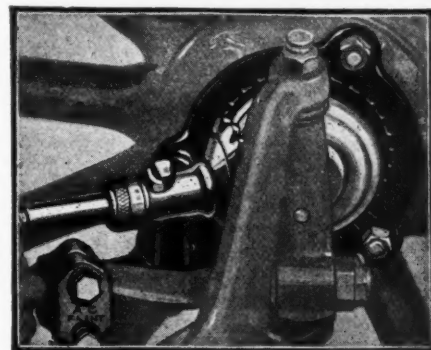
So, passenger car dealers believe they would have success, likewise, with the plan. Dealers interviewed have little

objection to offer to the weekly payment plan. Some say that extra cost of collection entailed might be an obstacle, but that objection is easily answered by the fact that it is better actually to collect the money, even if collection costs a trifle more, than to take back the vehicles and call the transaction "no sale."

One other objection voiced is that the weekly collection plan might involve the handling of too much paper and extra bookkeeping, but such points have not stood in the way of those who have been making sales after this method.

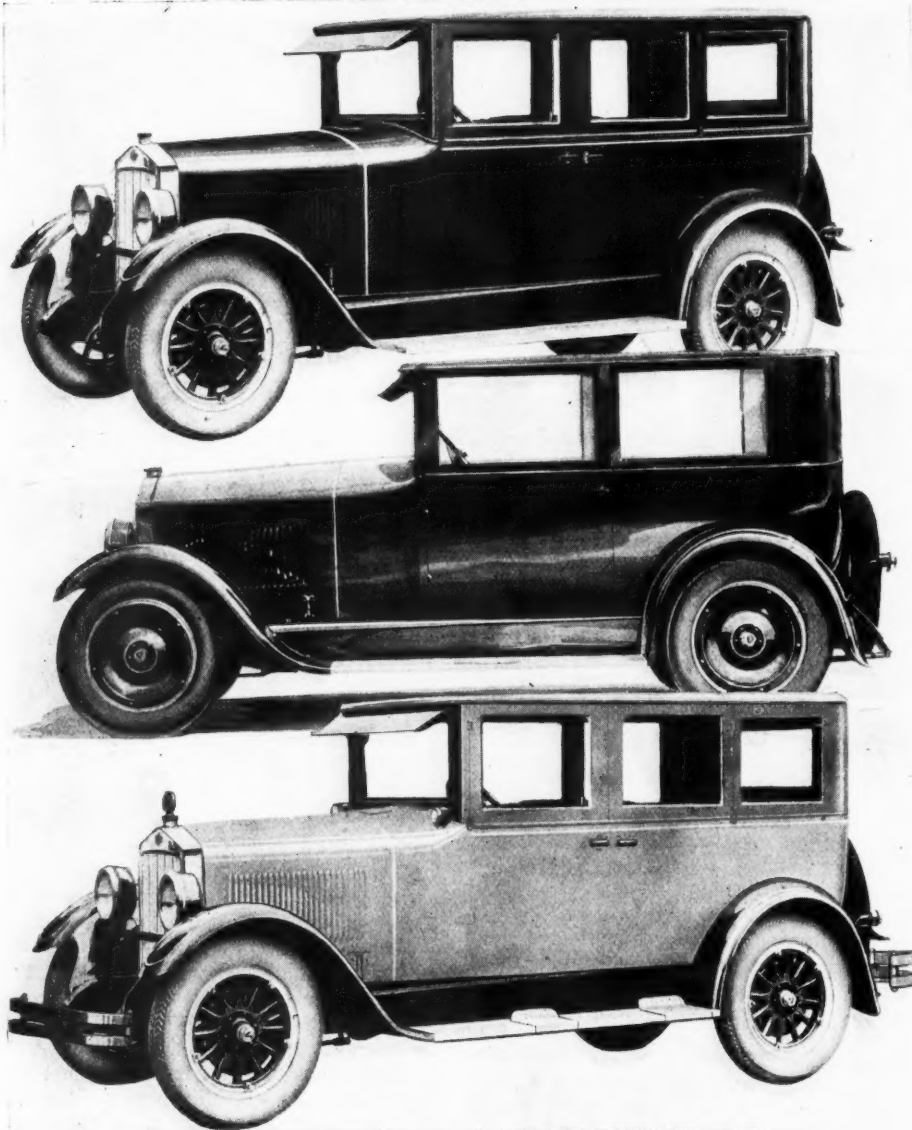
## AC Speedometer and Drive for Fords

On page 21 in the August 7 issue of MOTOR AGE there appeared a description of the new AC speedometer drive for Fords in which the cut illustrating the drive as attached to the front wheel was in the wrong position. The cut is printed on this page in the correct position. The caption under the cut in the August 7th issue also was somewhat misleading in that it implied the price of the drive alone is \$15. The latter price includes the entire outfit of speedometer head and drive mechanism. This price is for the outfit east of the Rockies, whereas it is \$15.50 west.



Installation of the new AC speedometer drive for Fords. The fiber pinion meshes sidewise into the road wheel gear

# Velie 1925 Line Comprises Entirely New Body Designs



*Closed models included in the Velie 1925 line. Top to bottom, the five-passenger sedan, five-passenger coach sedan and five-passenger royal sedan*

*Balloon Tires and Hydraulically-Operated Four-Wheel Brakes Now Regular Equipment. Several Changes in Chassis. Springs Flat Under Partial Load*

ENTIRELY new and distinctive body styles are the feature of the Velie line for 1925, which consists of five body models including a five-passenger coach sedan at \$1,425. All bodies are mounted on the standard 118-in. wheel-base, Model 60 chassis, which does not differ materially from its predecessor, the Model 58, except that balloon tires and hydraulically operated four-wheel brakes are regular equipment, whereas formerly they were optional at additional cost. Prices on the new models, all of

which seat five passengers, are as follows:

Phaeton .....	\$1,225
Club phaeton .....	1,425
Coach sedan .....	1,425
Sedan .....	1,675
Royal sedan .....	1,925

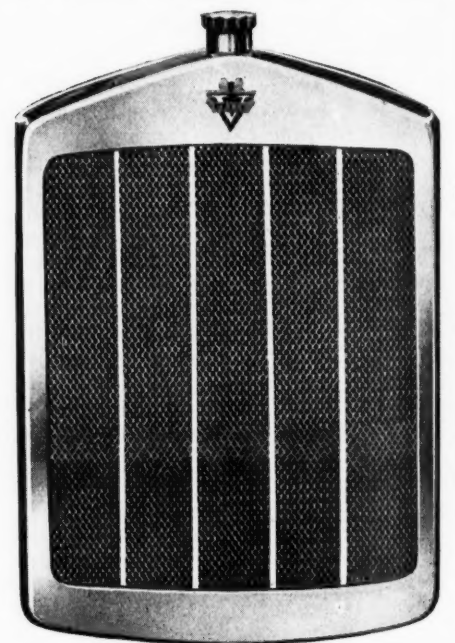
The front appearance has been improved by a change in the design of the radiator. The shell, which is finished in nickel, is 1-in. higher and the shoulder lines have been raised to permit better stream lining of the bodies. In addition, four vertical bars have been set into the

face of the radiator core thus dividing it into five panels. At the junction between hood and cowl there is an aluminum bead molding. All models also have a belt line, bead molding which, on the open models, extends forward to the radiator shell.

The phaeton, coach sedan and sedan are finished with three coats of black, baked enamel with attractive striping. The coach sedan is a two-door design and the width of its doors in conjunction with the arrangement of the folding seats, makes it possible for passengers to enter or leave the rear portion of the body without disturbing the occupants of the front seats. The windows in the doors and rear quarters are of generous dimensions. Disk wheels are regular equipment on this model.

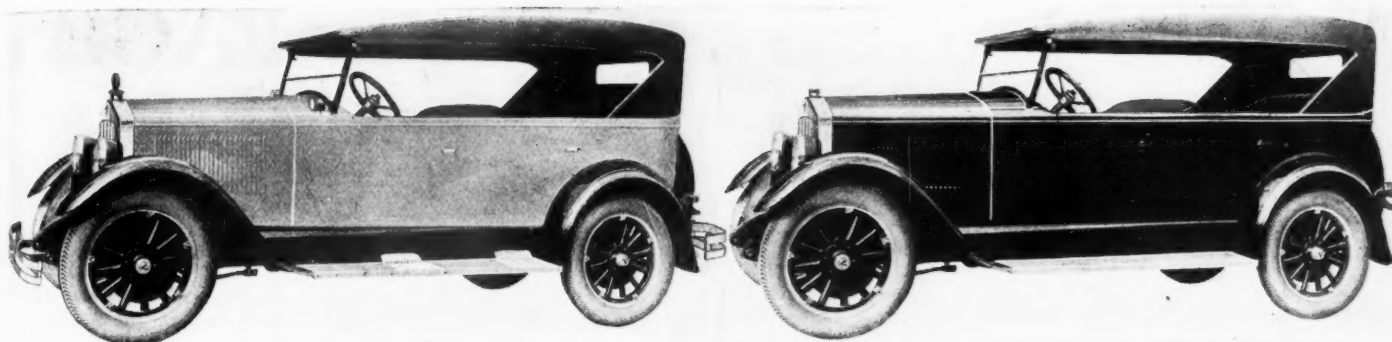
The club phaeton may be had finished either in Cairo gray or in Lotus blue with black belt molding and red striping. The same color option is offered on the royal sedan except that Thebes gray or Hathor blue, respectively, are used above the belt line on this model. Both the club phaeton and the royal sedan are equipped with front and rear bumpers, spare tire and cover, step plates, motometer and lock bar cap, dome light, smoking set, window shades and robe rail.

The most important changes in the chassis have been made necessary by the adoption of balloon tires and four-wheel brakes as regular equipment. The front axle is a reverse Elliott type of Columbia manufacture. To facilitate steering, the knuckles are fitted with ball thrust



*New radiator design used by Velie. The shell is finished in nickel*





The two open models of the new Velie line, showing at the left the club phaeton and at the right the regular phaeton

bearings instead of the washers used formerly, and the steering arm and tie rod connections are ball and socket joints. The king pin is inclined transversely and the wheels have a slight camber so that the center of tire contact is but  $\frac{7}{8}$  in. distant from the point of intersection of the extended axis of the king pin with the road.

To increase the spring friction, the number of leaves in the front springs has been increased from six to ten and, in the rear, from seven to nine. In the standard and royal sedan models, the rear springs have ten leaves. The front springs are now  $2\frac{1}{2}$  in. and the rear springs  $2\frac{1}{4}$  in. thick as compared with thicknesses of 2 and  $2\frac{1}{4}$  in., respectively, in the Model 53. The spring material is silico manganese steel instead of chrome vanadium steel used in the previous model. A Ross cam and lever type steering gear has replaced the worm and wheel type used formerly.

On the open models, 5.25 in. balloon tires are used while on the closed models the 6.00 in. size is fitted, both on 21-in. rims. The four-wheel brake equipment is a Lockheed installation and is the same as used as optional equipment on the Model 58.

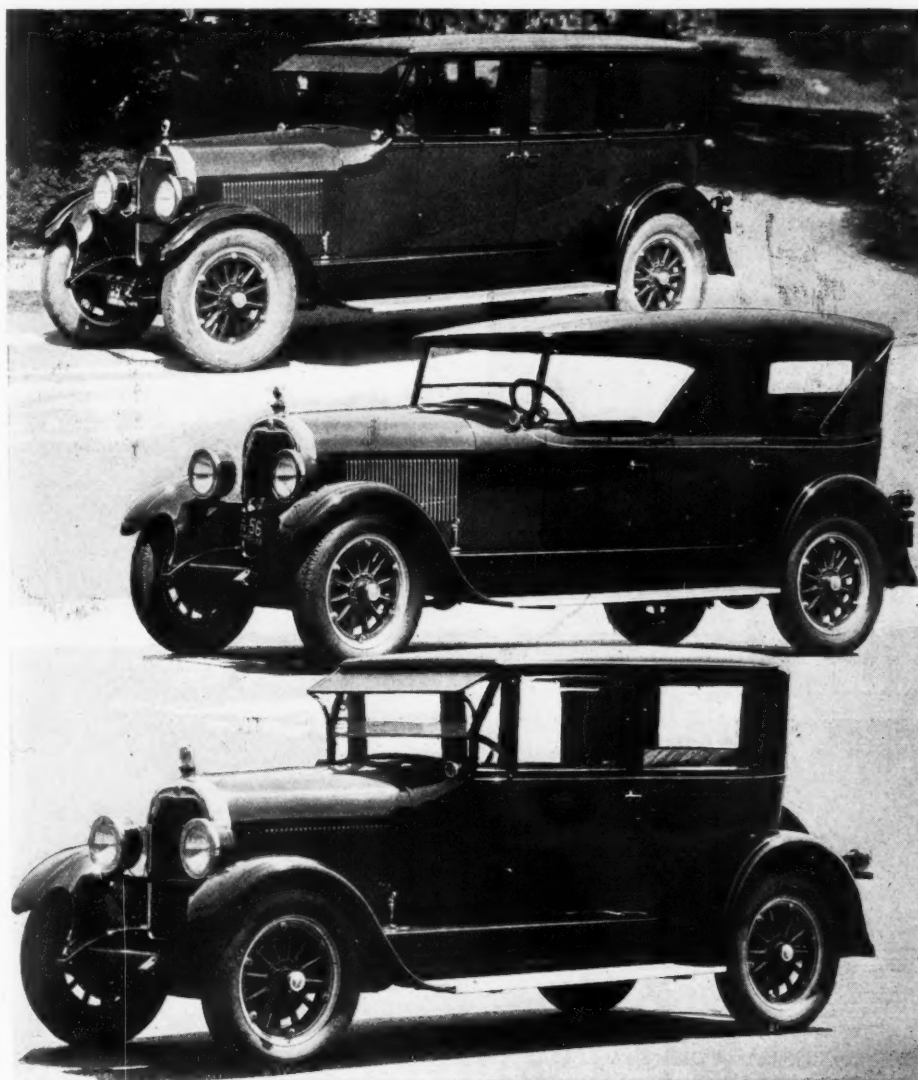
Two inches have been added to the rear of the frame and the mounting of the rear axle on the springs has been changed. The length of the rear springs has not been increased but instead the front hanger has been moved backward. Formerly the rear axle was mounted at the center of the rear spring but now, due to the changed position of the springs, it is two inches forward of that point so that the front portion of the spring is 4 in. shorter than the rear. This construction has been found advantageous in connection with Hotchkiss drive as it increases the stiffness of the front portion of the springs which takes the driving thrust and rear axle torque. The camber of the springs has been changed so that they are practically flat under a load of three passengers and are slightly reversed under a five-passenger load.

The engine is a six-cylinder,  $3\frac{1}{8} \times 4\frac{1}{4}$ -in. overhead valve type with pressure lubrication to main, connecting rod, wrist pin, camshaft and rocker arm bearings. With the exception of minor

changes, such as the use of lighter pistons and a pressed steel instead of an aluminum valve cover, it is the same as used in the Model 58. The new push type of Borg & Beck clutch in which the friction material is riveted to the driven

disk, also is used. The transmission gearset is a three-speed Durston mounted as a unit with the power plant and the drive is through a Thierner propellor shaft to the semi-floating, helical bevel rear axle.

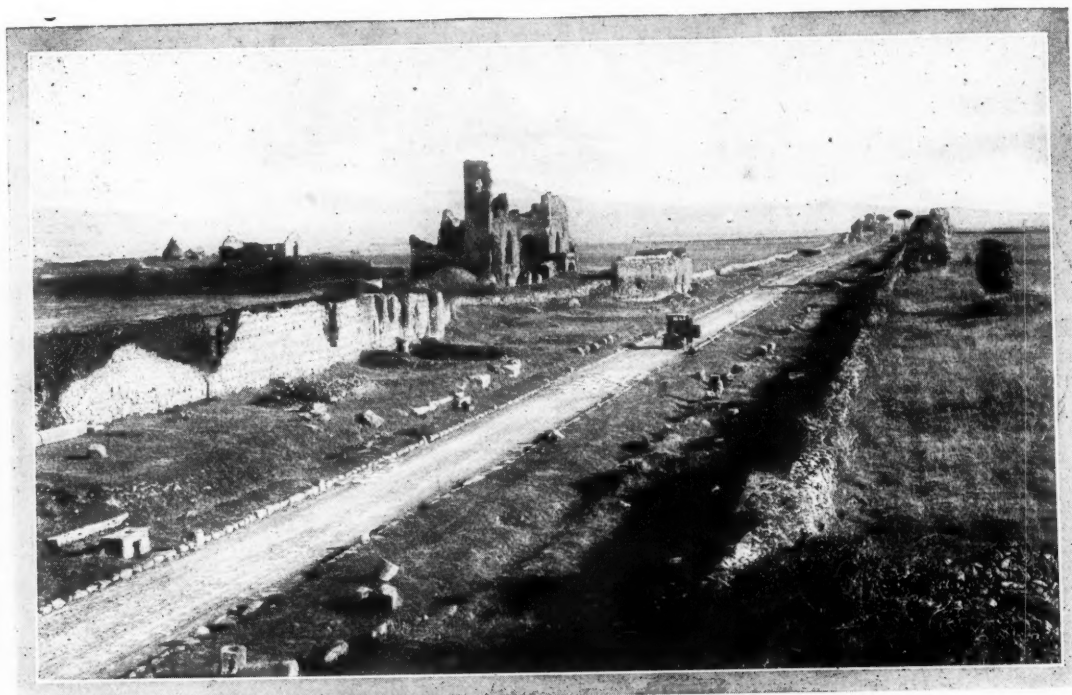
## New Peerless Models



Reading down, seven-passenger sedan, equipped with folding auxiliary chairs and selling for \$3295; seven-passenger touring phaeton listed at \$2485 and five-passenger coupe priced at \$2950. The folding auxiliary chairs, which are also a feature of the touring phaeton and coupe, are so constructed that three can ride on them with comfort. These models have been announced by the Peerless Motor Car Co. for the six-cylinder chassis



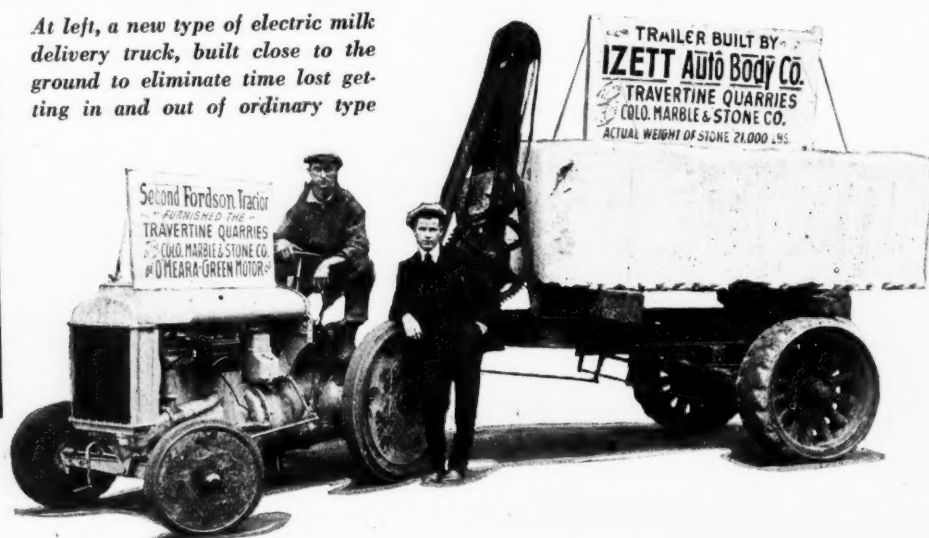
# MOTOR AGE'S PICTURE PAGES



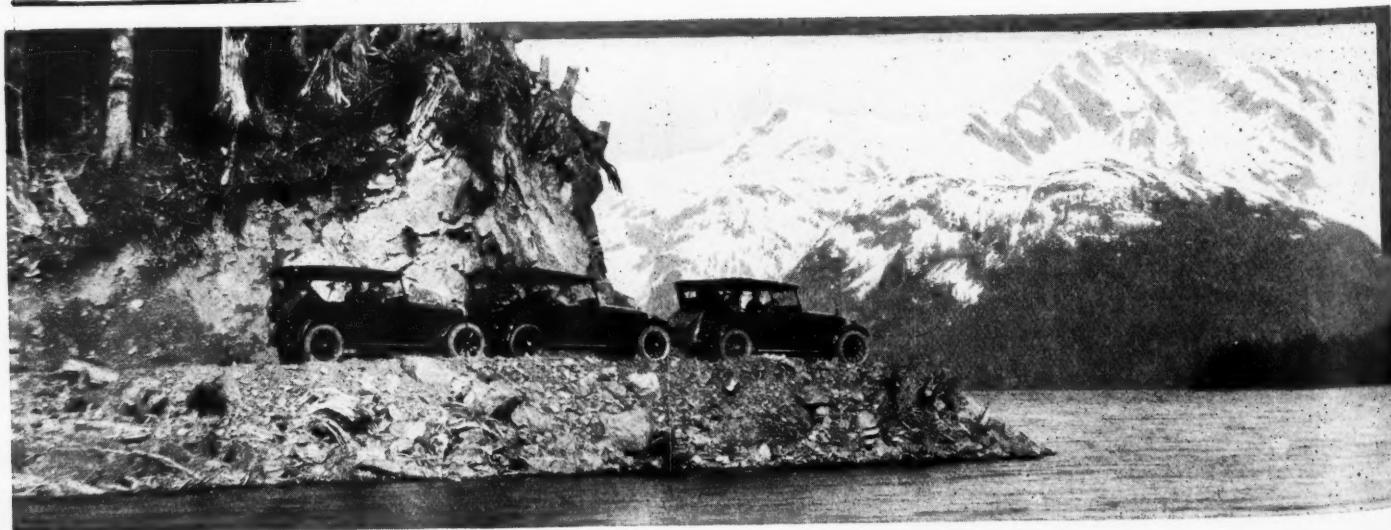
At the left, a section of road constructed by the Roman emperor Appius Claudius Caecus in 312 B. C., uncovered in 1850 to the 11-mile stone, and found to be in an excellent state of preservation. Below, how a Denver firm demonstrated the pulling power of the Fordson



At left, a new type of electric milk delivery truck, built close to the ground to eliminate time lost getting in and out of ordinary type



Below, three Studebaker Big-Sixes in passenger service in Alaska

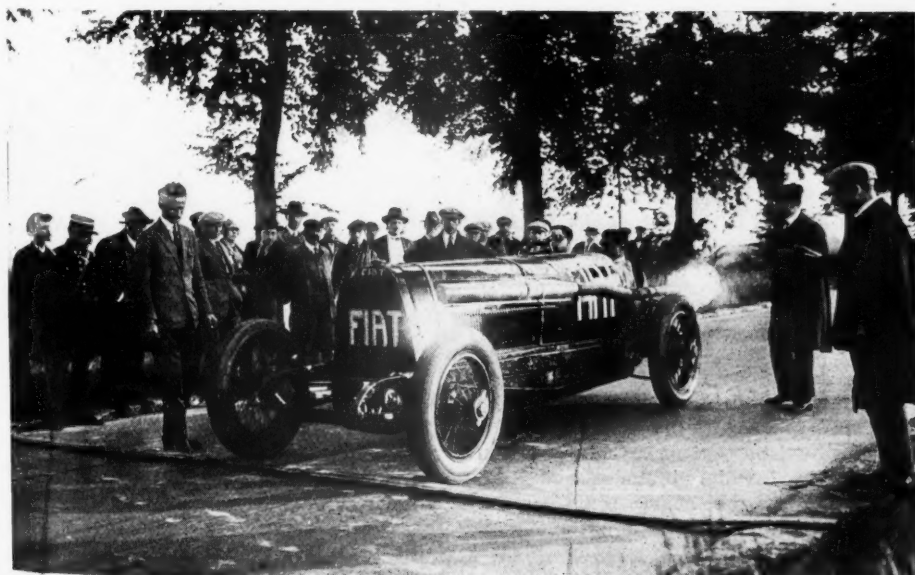


# OF AUTOMOTIVE INTEREST

At the right a \$200,000 garage at Long Beach, Calif., having a capacity of 250 cars. Below, Some cheese! A mammoth product made in New York and being transported on a Republic truck



E. A. D. Eldridge, a British amateur, recently traveled 146 miles an hour in a 300 hp. Fiat run on a normal highway from a standing start





# The READERS' CLEARING HOUSE

## Questions & Answers on Dealers' Problems

### Tilting Top of Axle Backward Gives Castor Effect to Front Wheels

**Q.** We are having trouble with a Ford truck on which we have installed a nine leaf front spring and since doing this it has not steered well. We think the trouble is due to the new spring raising the motor higher, which causes the radius rod to draw the bottom of the axle back. We have installed these springs before, however, and have had no trouble.

We do not believe that the installation of the spring alone could cause this condition although the front axle might have been just on the verge of giving trouble and the new spring has been the last straw. The remedy is to use the bending bar available in any representative Ford repair shop and tilt the axle backwards. The correct tilt is obtained when the cord of a plumb-bob can be held so as to touch the front side of the lower fork which holds the front steering spindle and at the same time the cord will be 5-16 inches from the upper fork or arm through which the spindle body bolt goes. Another condition to check on the front wheels is to see that the wheels toe in 1-4 inch at the front as measured between felloes. The cambre or amount that the bottom of the wheels approach each other as compared with the top should be from 2-1/2 to 3 inches, measured also between the felloes.

**Q.** We have also a Dodge Brothers roadster, 1917 model, which will not hold the road while driving at any speed. It has recently been overhauled at which time new king pin bolts and bushings were installed, also two new front springs. The springs raised the front end considerably higher than it was before. The wheels seem to be in good alignment both as to cambre and toe in. Springs did not come from the Dodge Brothers factory and we wonder if it might not be that they tilt the front axle the wrong way. Should the king bolts stand exactly perpendicular in this car or should they tilt slightly?—T. L. Scofield, Milbrook, Ill.

In any car the king bolts should tilt so that the upper end is toward the rear of the car, the amount varying somewhat with different cars. We believe that the general instructions given for the Ford car will apply to the Dodge Brothers car as well. The only difficulty with having too much tilt to the king bolts is that it is difficult to turn a corner.

### A KNOCKING OIL PUMP—PERHAPS

**Q.** We have a plunger oil pump on a Continental 7W motor which on accelerating and at speed of 20 miles or more, makes a noise like a very loose valve tapet only louder. The pump is new having been used only about 800 miles. What would you advise?—W. C. Painter, Painter's Garage, Darlington, Ind.

We are somewhat doubtful as to whether this is really the cause of the noise

### The Readers' Clearing House

**THIS** department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

that you hear. The plunger itself is operated by an eccentric on the camshaft and is returned by means of a spring. If the spring should be broken it might account for a noise of this sort, but on the other hand the pump would fail to operate for there would be nothing to return the plunger after it was operated by the eccentric. It is possible to get a very slight noise due to the action of the ball check, but if this is the case you can detect it by using a screw driver against the oil gage and holding the handle of it against your ear.

### NOT MUCH WIRING ON RACE CARS

**Q.** Send wiring diagram of the world's smallest racing car. The picture of this car was printed in your issue of October 5, 1922.—W. D. Webb, 334 N. Graham Street, Charlotte, N. C.

You do not state the page of the issue but we assume you refer to the article on page 20 and 21 in regard to the Monza speedway racer. If this is the case the wiring would be that of the high tension magneto used which includes high tension wires to the spark plugs and a ground wire for stopping as on any high tension magneto.

### When New Rings Are Not Effectual

**Q.** I have a 1923 Ford car which pumps oil, not exceptionally bad but uses too much oil and occasionally fouls a spark plug. I have not drilled the pistons but I have installed new Ford rings to no advantage. Some recommend the Telltale ring. I do mechanical work myself in one of the best equipped shops in Iowa, but not much Ford work. I put the Ford rings in according to their marks as to the taper in the ring. I have used all kinds of oil rings in larger car engines. If you consider any one make of piston oil regulating ring superior to another for Ford engine, would much appreciate your advice.—Hawkeye Subscriber.

In your work on other cars you probably use inside micrometers or a dial gage to find out whether a cylinder is out of round or not and the same procedure should be followed on a Ford car. There are many good piston rings on the market, but no matter how good a ring you use it cannot prevent oil leakage if the ring is round while the cylinder is egg shaped. We would suggest your removing the piston from the engine and examining the rings. You will probably find that they are making contact with the cylinder walls only at certain places. It would be well to use a thickness gage between the piston skirt and cylinder wall to see what the clearance is. With a re-ground job or one having new pistons in, it should be about .004 inches and if this has increased to .008 inches it means that new pistons should be lapped in. Eccentricity in the amount of .004 inches will also be excessive. Where some eccentricity exists and it is decided not to re-grind or put in new pistons it is desirable to lap the pistons rings in so that you do not have to run for 2000 or 3000 miles in order to get them to fit. There is also not much question but what better results are obtained in regard to oil pumping if some method is used to drain the oil back into the crankcase. You are doubtless familiar with the method of beveling the lower ring groove, which is quite effectual when holes are drilled at an angle. Some rings are also designed so that holes can be drilled directly in the bottom of the lower ring groove, the oil scraping ring then permitting the oil to go through the piston and drop back into the crankcase.

### SOME OLD TIME CHARIOTS

**Q.** Did Maxwell market or build a six cylinder car and if so in what year?

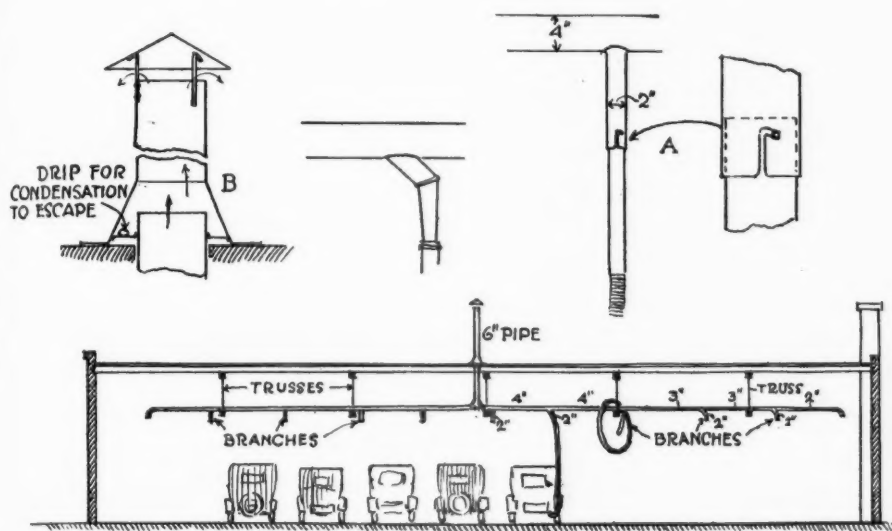
In 1914 Maxwell put out model 50, which was a six cylinder car.

**Q.** Did Scripps Booth build an eight cylinder car and in what year?—G. A. Puddy, Leavenworth, Kansas.

Model D Scripps Booth, an eight cylinder car, was built in 1916 and 1917, and model H, also an eight cylinder car, was built in 1918.



## Shop Ventilation a Serious Problem



Q. Our shop is about 40 by 95 feet, of brick, has two skylights with ventilators, also plenty of windows, but in cold weather at times it is almost impossible to keep the air fit to breathe. Our heater is small and we no sooner get it warm than we have to open some windows and air out. We repair all makes of cars and to put a pipe from the exhaust pipe to a window is not very satisfactory especially when the motor is started for just a short time. An exhaust fan would mean wasting heat and our heater is small. Have thought of an exhaust fan in a large pipe with flexible tube to the motor exhausts. What can you suggest? How is this handled by the larger service stations? Would appreciate any information you can give me.—H. M. Manchester, Providence, R. I.

In your letter of August 4 you have about "hit the nail on the head." If a large fan is installed to supply fresh air or exhaust the bad air, a heavy burden is put upon the heating plant and the expense of heating the shop is increased beyond all reason. There is really no way to keep the air good in a shop of this sort except by the use of pipes and flexible tubes or hose connecting the exhaust of the engines which are to be run. This is a nuisance and unless the rule is rigidly enforced men will not take the trouble to connect up the tubes with the ventilating system. To make the operation less irksome, it is a good plan to run a pipe along the ceiling or underneath the trusses in such a way that branches may be taken off at intervals wherever cars are to be placed. A pipe for this use may be ordinary stove pipe and the smaller tubing, such as is used in downspout work on the outside of houses. This comes in reasonably long pieces, two, three, four, five inches in diameter and above this size stovepipe

may be substituted. If there is a brick chimney or stack which this main pipe may be connected to, so much the better, but if not, a galvanized iron stack of suitable size may be run out through the roof and extended a few feet above, so that it will not be affected by draft or winds, as shown in our sketch. If there are posts in the room and they are located near the pipes where the exhaust will empty into the pipes, it is a good plan to extend the pipes from the ceiling down the posts to a part near the floor, in this way they will be less liable to injury. The pipe ends should all have some sort of damper or cap to put over them so that they will not be working when not in use.

The main pipe must not be run out of a window or through a side wall, as wind in different directions will operate to stop the draft entirely. If the outlet stacks or pipe is high enough, a good draft will be obtained, but if this is not the case sometimes a motor fan can be used to help the draft along when the natural draft does not seem to work well enough.

In order to save the expense of a number of connections, one for each branch, a slip joint might be used on the branch, as shown in our sketch and three or four of these connections used and moved around to where they are needed, all of the other branches, of course, kept closed. We have seen this scheme worked in one way or another and know it will work to perfection provided it is used. As stated above, however, there must be an absolute rule or it is no good at all.

## A Transformer for Lead Welding

Q. We would like some information as to the construction of the transformers that are used in burning on the straps with an electric arc for battery work. What is the secondary voltage on which this arc operates and how many amperes does it draw? We have made a transformer although not for this purpose, which we have been using for leading in handles in battery boxes and this works fairly well only it is hard to maintain the arc which operates on 25 volts. The specifications of our transformer are as follows: Core—outside dimensions 7 in. by 4½ in. Cross section 1½ in. square. Primary 265 turns of No. 18 enameled wire on each leg, or 530 turns in all. Secondary, 137 turns of No. 14 D. C. C. wire on each leg or 274 turns in all. Primary voltage, 110. Cycles 60. What changes would you suggest in making a new transformer for lead burning, that is, in size of core, size of wire, number of turns in primary and secondary windings? What size carbon should be used?—F. P. Herrmann, 1714 W. North Avenue, Baltimore, Md.

A devise of this sort with which we are familiar is made by one of the large electrical companies and does not produce an arc. A carbon however, is used for the purpose of burning on battery terminals, the principle being that a very heavy current at low voltage is passed through the carbon and lead which is being burned. The high resistance of the carbon causes this current to produce a great deal of heat at the tip of the carbon which is worked around in the lead, until the lead weld has been made. We do not know of an actual arc being used for this purpose and assume that the device above described is what you refer to. Generally in transformers it is considered that the voltage varies in proportion to the number of turns used in the winding and accordingly we would figure that your transformer would give a 2 to 1 ratio or about 55 volts instead of 25. A well charged storage battery may be used for the same purpose of sending a heavy current through a carbon stick and generating enough heat to melt lead and make a weld. For this reason we assume that a 6-volt winding would be about right and the current would be increased in proportion as the voltage is reduced. You would accordingly need comparatively few turns of heavy copper strap, perhaps similar to the copper strap used in the field coils of Ford flywheel type magnetos. We have no designs on this however and can only offer suggestions and fundamental ideas. The size of the transformer will be in proportion to the amount of electrical energy or watts being transformed. It is possible that from your previous design you can make an estimate of the size need. We would estimate a current of 100 amperes at 5 or 6 volts as being desirable.

### Architectural Service

IN giving architectural advice, **MOTOR AGE** aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected to be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

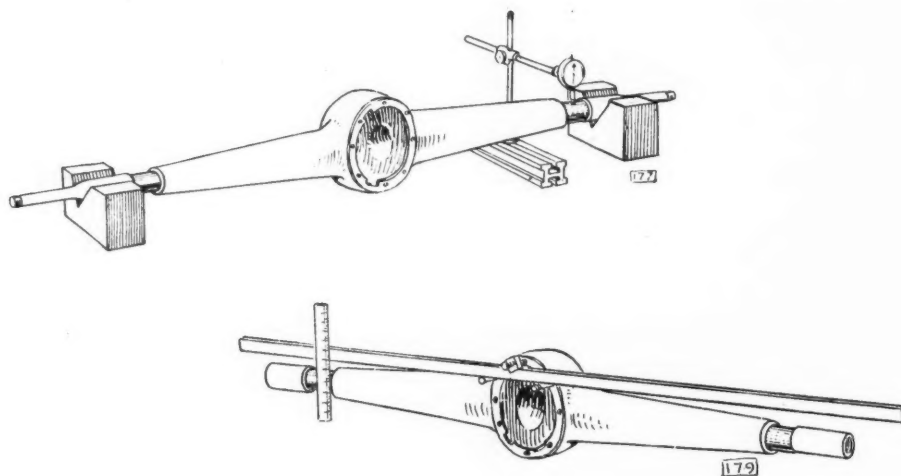
How much of an accessory department is anticipated.

## Straightening Rear Axle

Q. Will you please advise us the best way to straighten a Dodge rear axle housing that has become bent so that rear wheels toe in at top? Also how to check up on work so as to know when housing is back to alignment.—Eureka Garage & Supply Co., Eureka, Nev.

If the axle is of the semi-floating type as used on late model Dodges the best method of detecting mis-alignment is to remove the axle and strip the housing from all attachments, even the spring saddles. Then in place of the rear axle shaft bearing outer nuts, screw in solid nuts in the same place at the end of the

housing. The solid nuts will be fitted both style housings is accomplished with an acetylene torch and is best done by an experienced blacksmith. When testing the full floating type of axle the readings can be made on the rear axle spring saddle seat. Another place the readings can be taken is at the differential or banjo part of the housing, using the two faces. The latter method is illustrated at Fig. 179. If the misalignment or bend is in excess of  $\frac{1}{8}$  of an inch any way it is not advisable to straighten and a new housing should be purchased. Axle bending is accomplished by local heating and by pressing down with a long lever.



with a center. Use two of these solid nuts, one in the head of the lathe and one in the tail stock. Then mount the housing between the centers and revolve it by hand, using the tool post to detect mis-alignment. The method just mentioned is outlined at Fig. 177 and Fig. 178.

If the axle housing which is bent is of the old style full floating type, tests to detect mis-alignment are as follows: Jack up rear axle, make sure that both rear wheels are properly adjusted. Then with a stick that will reach from the inside of the left-hand wheel to the inside of the right-hand wheel, measure the distance across. Before doing this line up the wheel so that both valve stems are in the same relative position. Now turn the wheels 90 degrees, keeping the valve stem in the same relative position; that is, both wheels the same distance, and take the second reading. Do this in four places at the complete revolution, and note any variation in the distance measured on the stick. This will tell you whether the axle housing is out of alignment and in which direction it has been sprung. To straighten proceed as follows:

Mount the housing which has been previously stripped of all parts on Vee blocks, which will rest on the housing end which formerly carried the wheel bearings. Rotate the housing on these blocks and with a piece of chalk which is held steady note the high and low spots, which will be detected by the housing running eccentric. The straightening of

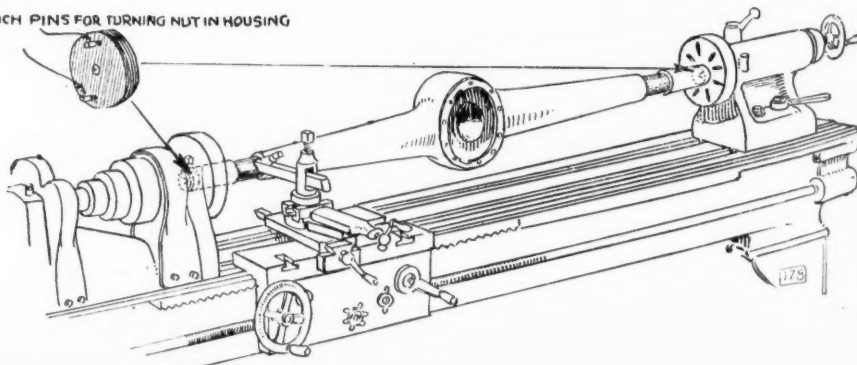
## READER'S ANSWER ON LOW GEAR TROUBLE

Q. In your reply to Mr. Carlos Farris of Tilford, Kentucky, would suggest examining for broken transmission which causes binding or drag in low gear. We had a similar case some time ago.—William J. Mangold, Center Valley, Penn.

We are very grateful for this suggestion, which seems to be a likely cause of the trouble and will transmit the information immediately to Mr. Carlos Farris.

**H**AVE you read the second installment of the article by B. M. Ikert on profitable uses of the lathe? It appears on page 15 of this issue of *MOTOR AGE*. You can't afford to miss this. The first installment was published in the August 14 issue, page 18.

$\frac{1}{2}$  INCH PINS FOR TURNING NUT IN HOUSING



## Who Reground It?

Q. We have a 1916 Hupmobile which has been giving considerable valve trouble for the past year. About a year ago we had a regrind job done on this machine and had new pistons fitted. We had to have about  $\frac{1}{32}$  in. taken off the top of the piston to prevent striking the top of the cylinder block which the original pistons did. Now the exhaust valves of number two and three cylinders scale up around the seat thus stopping compression in these two cylinders. This happens about every 1200 miles. After driving the car for 1000 miles after the regrinding job was done, the exhaust valves in Nos. 1, 2 and 3 cylinders were completely burned. These were replaced, but as stated above two and three still give trouble by scaling up. The motor works well after grinding the valves each time. I have checked both timing and valve clearance.—North End Garage, 240 N. Mohawk Street, Cohoes, N. Y.

This particular Hupmobile has an engine with rather high compression which will tend to overhead the valves more than would be the case with an engine of lower compression. For this reason it might be well to try a set of alloy steel valves. Names of concerns making such valves will be given by separate letter. We suspect that the tappet clearance has been insufficient and that at high temperature the valve stems have elongated sufficiently so that the valves do not quite close. We would recommend a clearance not less than .005 inches and even with this clearance it might be well to check up when the engine is excessively hot to see if there is still some clearance left. A carburetor adjustment which gives a very lean mixture will also tend to burn the valves. We do not believe that the regrinding job was very well done or the ridge at the top of the cylinder, left by the old piston, would have been removed. This is what doubtless necessitated cutting down the tops of the new pistons to prevent their striking.

## DATA ON HENDERSON MOTORCYCLE

Q. Give N. A. C. C. horse power rating also bore and stroke of the four cylinder Henderson motorcycle and advise location of factory.—H. A. Birdsall, Mooresville, N. C.

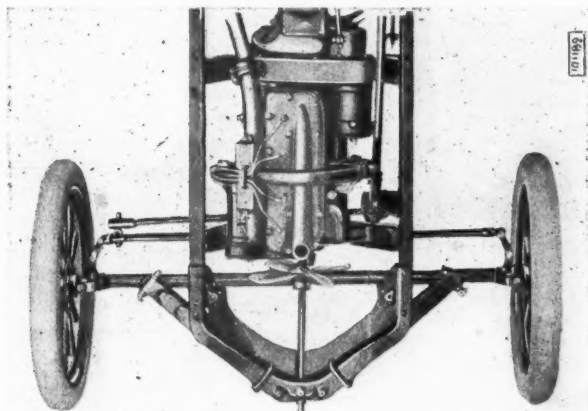
There are four cylinders  $2\frac{1}{8} \times 3\frac{1}{2}$ , giving S. A. E. horsepower of 11.66. The factory is Excelsior Motor Manufacturing & Supply Company, 3701 Cortland street, Chicago, Illinois.



## This Car Jerks

Q.—What is wrong with an Overland four when driving along on the road the wheels begin to wobble so badly that it nearly jerks the steering wheel out of the driver's hand? We put in new spindle bushings, also steering gear bushings, and it stopped it for a while. How can we remedy this? It seems as if the fenders have settled close to wheels and sometimes the tires rub on the fenders. How can the car be brought back to normal after it has settled.—C. B. Norris, Marrowbone Garage, Marrowbone, Ky.

We are showing an illustration of the front end of the Overland four. In this view it appears as if the upper ends of the spindles slant forward but this is due to the way the picture is made. If the spindle should actually be this way or vertical it would account for the difficulty for the upper end of the steering spindle is supposed to lean toward the rear of the car at an angle of about 10



degrees. You state that the fenders are too close to the wheels and this may be due to the front spring sagging which would also account for your trouble in steering for it has a tendency to tilt the axle forward too much.

Another possible cause of this condition is a bend or break in the front member of the frame which has the center of the spring attached to it. If this has been bent downward due to collision, it will also tilt the axle forward too much. We would suggest that you remove the splash apron at the front of the car so that you can carefully inspect the front cross member of the frame and it is quite likely that you will find the spring sag so much that it will need to be reached or replaced.

It is sometimes possible to improve the steering even if the spring and front cross member are not exactly right by working with the attachment plate at the end of the front spring. The front spring itself is attached on top of the axle while this plate goes under the axle, and if work at this point is carefully done it is possible to make the axle tilt backwards in spite of trouble with the spring and frame. This is not the best

way of correcting the difficulty, however, and is not recommended as a permanent repair.

## TIGHTEN STEERING CONNECTIONS TO REDUCE TENDENCY FOR FRONT WHEEL SHIMMY

Q. Advise how to adjust the front wheels on a Ford touring car. It drove o. k. until I put on semi-balloon tires. Now when we drive it slowly the front wheels shimmy until the whole Ford shakes. Then the outside of the tread on the front tires is wearing out faster than the inside. We have had these wheels adjusted several times but it has done no good.—Carl Dukes, North Baltimore, Ohio.

The semi-balloon tire has a diameter slightly greater than the conventional tire which causes contact with the road to occur at a point inside of the normal position. This means that there is some tendency for the car to act as you describe, but we understand that this can be overcome if the front system is thor-

oughly tightened up. This may necessitate replacing the bushings and having the steering mechanism tight in every particular, but it does not necessitate having the connections so tight that the steering is difficult.

## Miscellaneous Mercer Data

Q. On a Mercer car model 22-73, is the frame on the 6-passenger touring the same except for the length, as it is on Raceabout and the Runabout?

The Runabout was made on a chassis having a wheelbase of 115 inches, while the Raceabout and all other models were made on a chassis having a wheelbase of 132 inches. Aside from the length the two chassis were identical.

Q. Does the motor set the same distance from the front cross member in all these cars?

Yes, the difference in length was between the rear axle and the center of the car.

Q. What is the length, width and number of leaves in the springs of the above mentioned models?

On the 132 inch wheelbase car the rear spring was 59½ inches long, was 2¾ inches wide and had 12 leaves. On the 115 inch car the rear spring was 53½ inches long, 2¾ inches wide and had 9 leaves. On both models the front

spring was the same being 38½ inches long, 2½ inches wide and having 9 leaves.

Q. Explain the action and adjustment of the timing chain tightener on Mercer model 22-73.

While some of the Mercer cars had adjustments of one sort or another we are advised by the local Mercer agency that this particular model had an idler which permitted no adjustment. Information was also given to the effect that on this particular model a new chain was required when the old one had elongated excessively. Some model Mercer cars, however, contained an idler which operated by means of a spring which maintained the proper tension to the chain, while other models had an adjustment of one sort or another.

Q. How many links should there be in this timing chain?

A. 29.

Q. How many links should there be

A chain of this sort is considered to have the right tension when pressing on the flat part of the chain will depress it from ⅜ in. to ½ in. out of a normal straight line between the sprockets.

Q. Give names of firms having used parts for this model, also the names of any firms which might have a used Raceabout body.—Dan Enright, Tama, Iowa.

This information is not available but we would suggest your referring to the concerns advertising in MOTOR AGE, or it is possible that an advertisement placed in the broadcaster might give results.

## A LAZY MARINE ENGINE

Q. Am having trouble with a Marine engine which I have fitted with new piston rings, ground the valves and adjusted the bearings and yet the engine will not turn up more than 900 revolutions per minute, while it is supposed to turn up at 1100 to 1200. The compression is good and so are the valves, having a tappet clearance of .003. The engine is fitted with a Bosch DU4 magneto and is timed on top dead center retarded with the contact gap of .016 and a spark plug gap of .020. The trouble apparently lies in the fact that the engine goes no faster at wide open throttle than it does at half open, but to prove that it isn't in the carburetor I took another one of the same make off of another engine of the same make and it was just the same. Both of these engines are the same in every respect, that is, all adjustments are the same and so are the pistons rings, but the one will take the gas to the last notch. Although marine work is a little out of your line, I would greatly appreciate your advice.—Reginald H. Trenor, Blubber Bay, British Columbia, Canada.

Two things suggest themselves as the cause of the lack of revolutions. They are weak valve springs and too close a tappet clearance. The .003 tappet clearance sounds too small for an engine which is subjected to full load at all times which is the case in a marine engine. We would suggest that you increase this clearance to at least .006 and then try the engine. Regarding the valve springs you could make a test to see if this is the trouble by removing all of them and inserting about ¼ of an inch of washers under each one so as to increase the tension. We are considerably interested in knowing the outcome of our suggestions and would appreciate hearing from you as to the results.



## A Three Cylinder Engine That Burns Up Its Coils

Q.—We have a three-cylinder 40 hp. Westinghouse gas engine equipped with Atwater-Kent ignition system as used on automobiles. The engine is equipped with Champion spark plugs and has a generator that runs all the time when the engine runs to charge the batteries. We have put in new resistance coils in the distributor and use a 6-volt Willard battery. We have a lot of trouble with contact points in the distributor burning black. The transformer coils will get so hot that the engine will stop in one-half hour to one hour. We tried three coils in one day and the same thing happened each time. They get so hot that you cannot lay your hand on them. The engine seems to work alright when the coils are cool. The best mechanics around here have been unable to determine the cause of this trouble.—L. J. Cunningham, Dayton, Pa.

A.—We do not happen to have any data on this particular Westinghouse gas engine and accordingly, do not know the exact arrangements you have used in adapting an Atwater-Kent ignition system to this three-cylinder engine. If we had this information it might throw some light on the subject. One thing that occurs to us, however, is that you may be using an Atwater-Kent coil designed for open circuit service in connection with one of the closed circuit, type CC Atwater-Kent ignition units which has the breaker points and distributor in it. If this is the case it explains your trouble. To determine whether the coil is right or not for the type CC ignition unit, you can connect the coil to a six-volt battery, having an ammeter in the circuit. The coil should draw about 5 amperes. Then when the coil is in service and the interrupter is operating the average current should not be more than 1.5 or 2 amperes. If you are using the wrong kind of coil it may draw 15 or 20 amperes when the contacts are closed and may average 8 or 10 amperes which will account for the burning of the contacts and the overheating of the coil. If you have the right kind of a coil we hardly understand how you can install the resistant unit, for with Atwater-Kent coils the resistant unit is built in the coil at the top, and while it can be seen through openings in the top of the coil, we understand that it is not feasible to replace it.

### IMPOSSIBLE VALVE TIMING CONDITIONS

Q. In timing a 1921 Oakland, model 34C, according to punch marks I find that the intake opens about 35 degrees before top center, but the exhaust does not close before about 25 degrees after top center. This is what seems odd to me that there should be so long between the opening and closing of the exhaust and that the intake should open before the exhaust closes. When I run the car at 30 miles per hour for a short time the engine gets awful warm in warm weather and the water will boil. If you have any suggestions to make it will be appreciated.—Triangle Garage, Bonduel, Wis.

If the valves are opening and closing as you stated the camshaft must be broken or cracked and we cannot imagine such a condition existing, as the engine would not run. As the cams are

integral on the shaft it would be impossible for them to slip out of position. The correct timing for the engine is as follows: Exhaust closes  $7\frac{1}{2}$  degrees after top dead center which is equivalent of  $\frac{1}{32}$  of an inch piston travel after top center. Inlet opens  $17\frac{1}{2}$  degrees after upper center which is the equivalent of  $\frac{9}{64}$  piston travel. If you will carefully locate the dead center position and set the exhaust valve closing when the piston is  $\frac{1}{32}$  of an inch down we know it will be correctly timed and you will need pay no attention to the marks on the gears.

## Everything Wrong

Q.—We have a Ford car 1922 model which has a peculiar noise. Sometimes it is like a gear roar and then like a valve and tappet slap and once in a while like a piston slap for about a minute. It is also a bad oil pumper. Over a period of two years trying to overcome the trouble we have put in new rollers and sleeves in the rear axle, have adjusted the driveshaft pinion to a good fit, using prussian blue, have doubled the closing springs in the emergency brake shoes, have taken care of rattle in brake rods by using rubber bands, have put in new timing gears set to the Ford mark, have cleaned carbon and ground valves a number of times, using prussian blue, have put in new rings all around, one time putting in two top rings another time putting in one top ring, and another time using Starrett's feeler gage to get opening at the end of rings, .006 in., .004 and .002 in., respectively. The car has a Holley carburetor and stove and is fast on the road but will not throttle down very well. It climbs hills all right. The noise seems to be at the rate of 25 to 30 miles per hour. Above 35 miles and below 25 the car is smooth as can be. Also when starting cold can go the limit of speed for about  $1\frac{1}{2}$  miles without a noise. Spark is set so that one inch on quadrant will make engine kick. We also put in new camshaft bearings. Next time we clean carbon we are going to measure the intake and exhaust valve opening to see if the marks on the gears are right. Have used Standard Ford linings on the transmission bands. Also Raybestos, and now we have in a hand weave similar to Standard Ford. We drilled eight  $\frac{1}{16}$  in. holes in each piston in the lower part of the second ring groove. Do you think that eight  $\frac{1}{32}$  in. holes drilled in the top of the piston on line with top ring groove would do any good in regard to oil pumping?—P. B. Fitzpatrick, Indianapolis, Ind.

A.—From the symptoms described we believe that this car is suffering from a bad case of Tinkeritis. Frankly, we believe that the noise is due to natural vibration to which all engines are subject more or less at some certain speeds. Even in the design of race cars there is commonly a critical speed at which the engine becomes rough, while at lower and higher speeds it runs smoothly. You are making a mistake to put oil drain holes in the upper ring groove. These should be used in the lower ring groove only for the upper rings should be kept tight to hold compression. The symptoms are so peculiar that we believe it would be well to get in touch with the nearest authorized Ford service station and get the opinion of the service manager, as this case seems to be one that needs analysis by someone who is on the ground.

## Charging Batteries With Auto-Lite Generators

Q. I am starting in the garage business again and want to know if I can use one or more Auto-Lite generators like some on a model 90 Overland to furnish me direct current for the purpose of charging batteries. How many volts will this generator produce? We have 25 cycle alternating 110 volt current. Can I get a motor large enough to pull about three of these generators and use them? If so, how large a motor should I use? What is the output of one of these generators and how much efficiency has it? What would be the difference in the current of one of these generators and a constant potential charging machine? If I could rig up a machine of this sort what would be the best way of doing it? I can get a used motor and already have the generator, so they would cost nothing.—C. C. Powell, Perry, Mo.

One of these generators is suitable for charging one 6 volt battery and if you had a 12 volt battery you could charge half of it at a time. You will be able to operate at about a 10 ampere rate at a speed which we would estimate at 1500 r.p.m. but you can vary this somewhat with suitable pulley. Your A. C. motor will run about 1800 r.p.m. in all probability, so that you will need very nearly a 1 to 1 ratio on the pulley. With the output of the generator 12 amperes at a voltage which we will say averages 7, we will have an output of 84 watts. Figuring the generator efficiency at 75 per cent, which should be about right, it means that the motor must develop 112 watts for each generator being driven and as there are 746 watts to a horse power it means that the motor requires about  $\frac{1}{6}$  horse power for each generator being driven. Our recommendation would be to figure your other power requirements and if you are going to have a line shaft in the shop figure on having the A. C. motor strong enough to drive your shop tools and also drive two or three of these generators. You can use 6 volt cutouts in connection with generator and battery just as you would wire up the cutout and generator on a car and if you need any assistance in the matter of wiring diagram we will be glad to co-operate further. The difference between a generator of this type and the constant potential charging machine is that the constant potential machine may give out 80 amperes, 100 amperes or more, depending on its design when the batteries are first connected. Then when the batteries become charged the current will automatically drop off. Using the single Auto-Lite generators, however, you will get about the same current all the time, so that instead of charging a battery in 8 or 10 hours it will require perhaps double that length of time, at least when the battery in question is in a somewhat sulphated condition when brought in. If these generators are of the type which have third brush regulation you will be able to vary the charge somewhat so as to reduce the current to the battery as it becomes charged, which is recommended.

# BOOSTING ACCESSORY SALES

**T**HIS week MOTOR AGE offers another assortment of accessories which have made their appearance in the automotive market recently. Transportation merchants will be interested in these and will examine them carefully with a view to the realization of profits through the sale of them. Many a transportation merchant has found a gold mine in the sale of accessories. Why not you?

## Silent Generator Couplings

Dalton & Balch, Inc., 2333 Michigan avenue, Chicago, are the manufacturers of these couplings, which are made of Celeron, the same material used in their timing gears. This material is used for the purpose of securing silent operation. The couplings are made especially for Buicks and are machined to micrometer accuracy. The list price for all models up to 1920 is 70 cents each; for all models 1921 to date, \$1.25.



*Silent generator couplings*

## Ford to Market Accessories

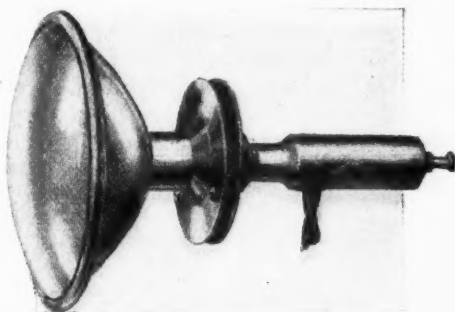
A dashlight, adjustable rear view mirror and windshield wiper have been brought out by the Ford Motor Co. and will be marketed through its dealer organization. Each item is packed in a distinctive carton bearing the Ford trademark. These accessories are the same as those furnished on the Ford sedan as regular equipment.

The dashlight is strongly constructed and is finished in black enamel to match the instrument panel. It is so designed that its base fits into the instrument panel instead of simply being held against the surface. The retail price on this item is 60 cents. The rear view mirror is of generous dimensions and is firmly held in place by means of a bracket of sufficient length to permit the mirror being adjusted to suit the convenience of the driver and locked in that position. This unit retails at \$1.50. The windshield wiper is so designed that the rubber wiper is firmly held against the glass thus insuring clear vision and preventing vibration. The price on the wiper is \$1.25.

## Ace Windshield Spotlight

A new spotlight for windshield installation is being put on the market by

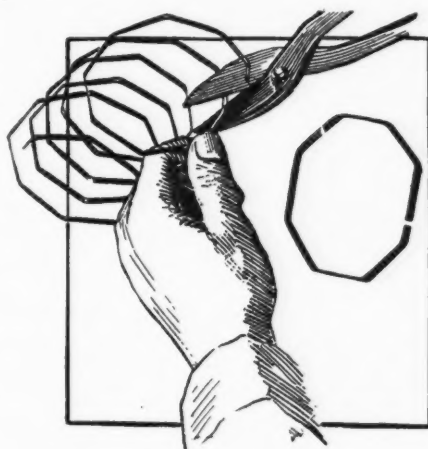
the Culver Stearns Mfg. Company of Worcester, Mass. A ball and socket construction permits movement of the lamp by operating the handle which is within easy reach of the driver of the car. The ball is constructed of German silver which will retain its appearance and not wear brassy. The wires from the lamp are brought through the handle in such a way that there is no tendency for short circuits due to operation of the lamp. A push and pull switch in the handle turns the light on and off, while to facilitate installation a cutter for making hole in windshield is furnished at a nominal price. The lamp retails at \$7.00 complete with 21 c. p. bulb.



*Ace Windshield spotlight*

## Reel Inner Rings

These, when installed according to instructions printed on each container, are guaranteed by the manufacturer to stop piston slap, stop oil pumping, save gas and oil, restore compression and eliminate excessive carbon. They are sold in 25 ft. lengths in cartons, made of finely tempered steel, and are cut by the me-



*Reel inner rings*

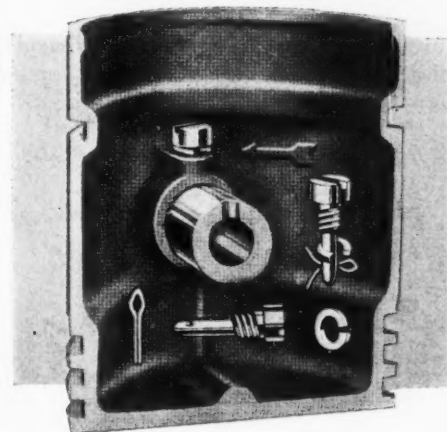
chanic according to the size and length required. Various sizes are supplied. One hundred feet can be bought for \$6.

The rings fit under the piston ring and are designed by their resiliency to centralize the piston and cause an oil and

compression tight fit and thereby eliminate piston slap and oil pumping, causing the rings to wear true on the face. They are made by the Smalley Accessories Corp., 5143 Lake Park avenue, Chicago.

## D. & B. Piston Pin Locks

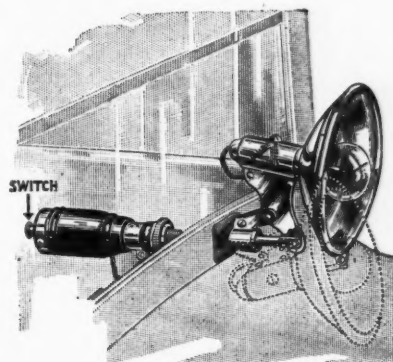
D. & B. piston pin locks are designed for Buick models E, H and K and D 34 and D 35, and comprise a special set screw fitted with a thread of steep angle, and method of retaining by cotter pin. They are used to replace the regular Buick piston pin locking screw and can be applied in about the same time as required for the original screw. The price per set of six is 60 cents. The manufacturers are Dalton & Balch, Inc., 2333 Michigan avenue, Chicago.



*D. & B. Piston pin locks*

## Delta Spotlight

Installation of this device is made through the metal frame of the windshield; it shines from any desired position and a side light range of 120 degrees is claimed for it. It may be installed with switch only four inches from the steering wheel. It is manufactured by the Delta Electric Co., Marion, Ind., and the list price is \$6.



*Delta spotlight*

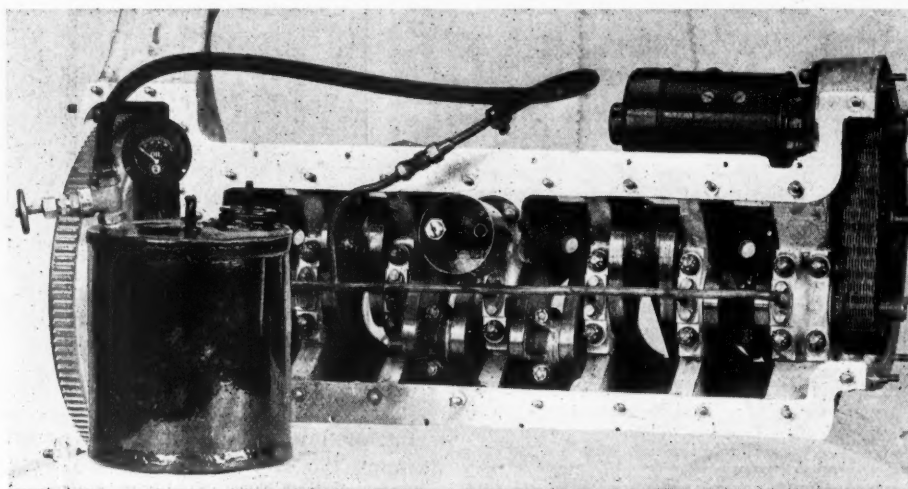


# GETTING MORE OUT of the SHOP

**A**UTOMOTIVE maintenance can be made to be productive of a golden harvest for the progressive shop man if he will study the most up-to-date methods of performing his work, which, of course, includes the most up-to-date articles of equipment for the shop in order that the work may be performed in the most efficient manner and in the shortest possible time. This week *MOTOR AGE* describes some new articles of equipment which are designed to make the task of the automotive shop worker easier and enable him to do more efficient work, all of which not only is conducive to satisfied workers, but to satisfied customers as well.

## Packard Oil Test Tank

To enable its dealer service stations to maintain proper clearances in engine bearing work, the Packard Motor Car Co. is distributing an oil test tank which is



*Packard Oil Test Tank*

a duplicate of the device used at the factory for testing bearing adjustment on new engines. With this tank it is a comparatively simple matter to turn out bearing work with proper clearances.

The tank is useful for diagnosing over-oiling trouble and also for checking clearances on bearing refitting jobs. In the former case, the value of the tank lies in the fact that it enables the mechanic to determine whether the over oiling is caused by the bearings or by the pistons and rings. In testing refitting work, the main and connecting rod bearing caps are set up to provide a minimum clearance of .001 in., and the cotter pins put in place. If this work is done properly, the crankshaft should turn over freely with the hand crank. The test tank is then used to see that the fit of

each bearing is correct.

The first step in the use of the tank, assuming that the oil pan has been dropped, is to disconnect the oil manifold from the oil pump. The test tank is then filled about two thirds full of oil and its hose connected to the oil manifold. Air is then pumped into the tank, through the tire valve provided for the purpose, until a minimum pressure of 30 lbs. is shown by the gage. The oil gage on the instrument board should also register this pressure except when cylinder 1 and 6 and on upper dead center, as in this position there is a direct flow of oil through the camshaft to lubricate the front end drive. The next step is to turn the engine over by hand. The flow of oil from the main and connecting rod bearings will be in drops before reaching the floor and should be at the rate of from 20 to 60 drops per minute. If the flow from any bearing is less than the lower limit, its clearance is too small

and, if the flow is more than the upper limit, the clearance is too big.

Where the mechanic is using the test tank to diagnose over-oiling trouble, if the bearings are at fault, the defect will be readily apparent and he can tighten up on the ones that are causing the trouble, until the flow of oil comes within the prescribed limits. In checking refitting work, the hand crank is a test against too small and the tank against too large clearances. The tank also assists the mechanic in holding the fits of the individual bearings more nearly uniform.

## New Model Dunning Compressor

The Dunning Compressor Co., Holmesburg, Pa., has added a new model to its line of compressors. Their Junior 2-cyl-

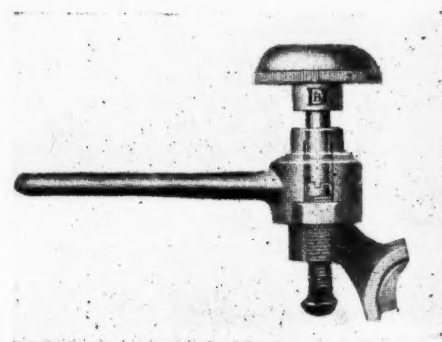
inder compressor is mounted on a 15 gal. vertical tank, with an automatic switch, automatic unloader, safety valve, gage, etc., and, in fact, it is designed to serve as a complete automatic unit for small filling stations and garages where a large volume of air is not needed. It embodies the same features as the larger types.



*Dunning Compressor*

## Kwik Adjustment Tool

Here is a tool for rocker arm tappet adjusting jobs which is a combination of wrench, pliers and screw driver. The tool is slipped over the end of the push rod and adjustment is made by means of the knurled screw driver head. The tool is balanced so that it will stay in position while shim stock is being inserted to check clearance. It leaves the hands free to make adjustment the first time, and while the engine is running. The tool comes in various sizes according to the kind of car on which it is to be used. It sells for \$1.75 and is made by Dalton & Balch, Inc., 2333 Michigan avenue, Chicago.



*Kwik Adjustment Tool*



## Buick Branch at Indianapolis in New Home

THE Indianapolis branch of the Buick Motor Co. recently announced that its new three-story concrete home is complete to the last detail of equipment. Occupied by the sales department and branch offices last fall, the most modern equipment of shop and service floors has been put in, and the plant now stands as one of the leaders of the country in sales, service and shop facilities with work conditions unsurpassed because of many features built into the structure and the equipment.

A concrete building 100 feet wide and 200 feet long with but three rows of columns at most, with a sales room 60 by 100 with but two pillars in it, with window sills flush with the street sidewalk, without a radiator breaking the line of the floor; with the entire third floor without a division wall, with glass walls on three sides and with skylights in addition, and with the fewest possible number of pillars, the structure is unique, among motor car buildings of this section.

When first conceived by J. E. Trotter, manager of the Buick branch, who has watched over Buick branch development at Indianapolis for ten years, and his assistant, J. E. Seward, now manager of the Buick branch at Jacksonville, Fla., the tentative ideas for the building with its minimum number of pillars desired were so revolutionary that two firms of successful architects said no such building could be designed. Finally another was found who said it was possible. He laid out the building according to the sketches of Mr. Trotter and Mr. Seward and it was constructed according to the Foster flat

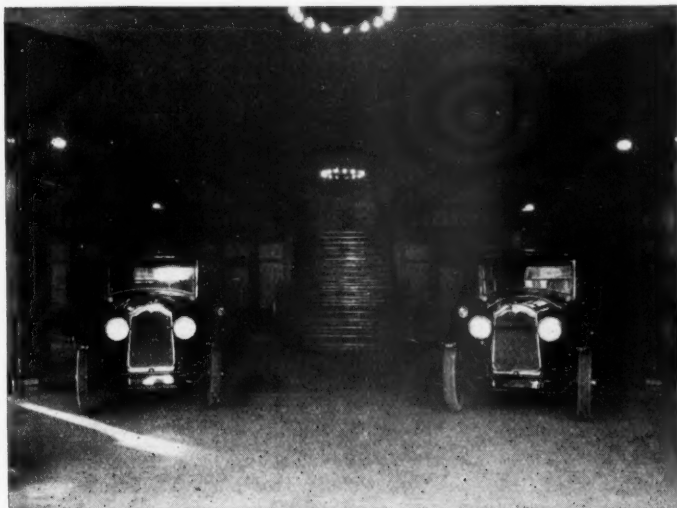
slab cantilever concrete design. The flat concrete arches of the cantilever slabs carry the load with the minimum number of pillars making for most convenient accessibility on sales, service and shop floors.

The first floor houses the sales room with its 60x100 feet of floor space broken by two pillars. Back of this is a set of retail offices housed beneath the mezzanine with its staircase that leads to the general offices of the branch that occupy the front of the second floor. At the rear of the first floor is the large service room of 100x124 feet.

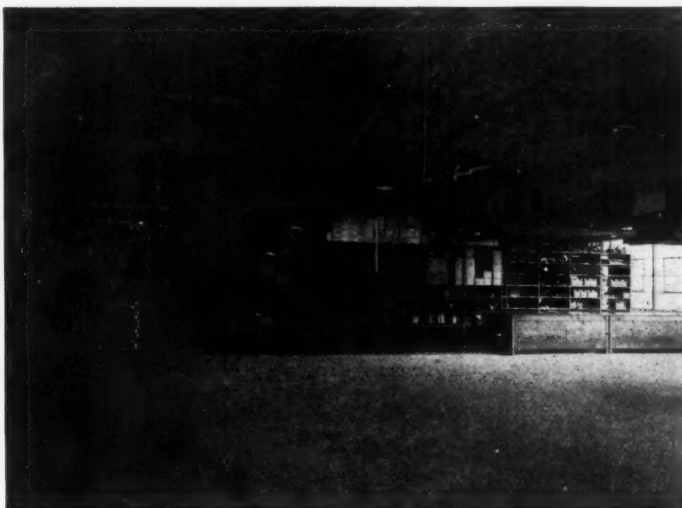
The rear of the second floor, back of the general offices, is given over to the store rooms of parts with its modern racks and conveniences. Pneumatic tubes and telarstographs connect all departments minimizing running around that marks the average motor car establishment.

The third floor in its entirety is given over to the shop and there is not a partition wall in this. Light flows in from glass walls and from skylights. Machines and equipment are largely set under these window walls, and overhead conveyor tracks carry heavy units to places they are needed. Here again the minimum pillars, which mark in the building is a very important factor, in accessibility and saving of space and light and time.

The simplicity and dignity of the entire structure, and the reserve with which decoration has been used add to the attraction of this extremely practical structure which has been laid out to gain utmost accessibility, light, space and convenience.



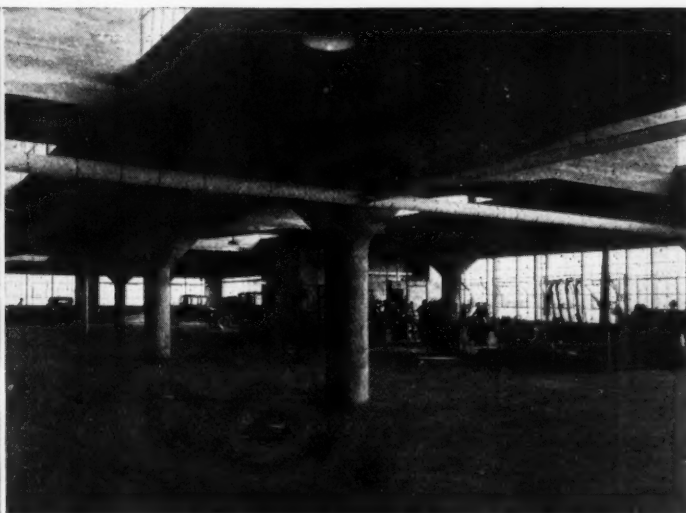
Show room floor front view. The stairway leads to the mezzanine floor which contains the general offices of the establishment



Parts and accessories store room located at the rear of the second floor. Pneumatic tubes and Tel Autographs connect this room with all departments



Service room 100 by 124 feet which occupies the rear of the first floor



Machine shop section of the service room. Note the minimum number of pillars

# EDITORIAL

## High Calibered Men

THE Firestone Tire and Rubber Company is justly proud of the fact that it has on its payrolls the names of a large number of college graduates. Recently the company published in its house organ the pictures of 33 graduates of last June who since have joined this organization. Apparently the Firestone company is going after young men of wide promise and there is no doubt but that the college training plus practical business training will make them valuable assets in the organization.

Demand is growing constantly larger for the services of high-class men and here we see a reflection of the condition. Automobile dealers often complain that they can not find the talent they require in salesmanship while the various shops are always in the market for thoroughly competent workers. Weeding out misfits and impossibilities in the local field and developing a higher order of competency all the way around was considered sufficiently important some time ago for the establishment of a special bureau by one of our live southern dealer associations. According to reports the association has made good progress in elevating the trade's employe personnel to a higher plane.

Just as we see misfits and incompetents disappearing from the field of dealerships we shall see a gradual fading of the less productive help. Dealers may not require a diploma but they do require efficiency. Opportunity for the high-calibered man in the automotive trade is unlimited.

## Safe Drivers' Clubs

SAFE Drivers Clubs, by one name or another, are springing up in all parts of the country. The usual procedure is to enroll those who are willing to pledge themselves to observe all safety rules and do what they can to promote the cause of street and highway safety.

Literalists possibly would say it should not be necessary to pledge good citizens to live up to the standards of good citizenship, which is what such cards amount to, but these safe driver clubs are quite valuable, in a way, and well worthy of encouragement.

Many times good citizens need to remind themselves of matters that go thus to classify them and it is not a bad idea now and then for even those who are consistently within the pale of good citizenship to take an open stand.

Lapel buttons proclaiming the wearers as apostles of safety will help hold them straight, no doubt, as well as scoring good influence among others who more sorely need the reminder.

## Exhibits at Fairs

GROUP exhibits at fairs by the automotive trade seem to be coming in for complications in a number of localities. One of the conspicuous instances is found in a report that the Wisconsin Automobile Show, which was to be a big feature of the State Fair at Milwaukee, was called off by the Milwaukee Automotive Dealers' Association which has sponsored this event for a number of years. Disagreement with the Fair management as a result of an eleventh hour decision to demand rentals of approximately \$40,000, as against the usual charge of \$4,000, is the reason ascribed for the association's action. Obviously the association had just ground for withdrawing.

We believe that the Fair management exercised poor judgment, for while the Wisconsin trade would have been glad to

participate on a fair basis, welcoming the opportunity to display its wares, the loss is more the fair's than the automotive trade's.

Popular interest of the public in the automobile is such as to make a large automotive display an attractive element of a fair, yet it is not at all necessary for the Milwaukee dealers association to stage this event in connection with the Wisconsin State Fair.

In fact, there are many special advantages in holding an automobile show independently. And this, we feel sure, is what the Milwaukee association will do in the future unless the Fair management is willing to offer acceptable conditions.

## Trimming Overhead

ONE of the most important features of business management is the proper readjustment of overhead to meet demands of changing condition. Automobile dealers have just gone through a period of overhead cutting. Some of these jobs we assume have been sane and scientific—others insane and botchy.

It is always a big question what to do in such emergencies—what to cut and how far to go with it. Manipulating the overhead is really one of the sciences of business and the subject is one which requires application due a science. False economy is one of the dangerous pitfalls and true economy, therefore, is the big thing to comprehend.

In a talk to his dealers recently a distributor asserted that there is only one general rule that could be prescribed in this connection. The rule he suggests is a fundamental which cannot be ignored. Here it is:

"I would say, simply, be thoroughly conversant with your business. Know your business from A to Z."

This might be accepted in some quarters as hackneyed advice yet it remains the most important thing to bear in mind if one would succeed, and it is because of limited knowledge of his business that makes it difficult in many instances for a dealer to meet the exigencies of the slack season. Fundamentals of this character bear frequent repetition and the time will not come when stressing them will be out of order.

## High Cost of Statistics

AN association secretary recently wrote the Illinois State Department asking for a copy of the state's latest automobile registrations by counties. In reply to his letter he received a communication from Springfield which ran as follows:

"The only list which this office publishes is a straight numerical one covering the entire state and for it I am required to collect an annual statutory fee of \$25."

This is not to complain about the response of the state secretary as he is merely complying with the law and could not be expected to do otherwise. All other applicants for such registration reports no doubt are accorded similar treatment.

But the automotive trade and the motoring public have a right to object to such a price tag on information prepared by a department which the motor vehicle so largely supports. Such statistics should be available at a nominal cost, if not free.

In putting a substantially prohibitive price on information of this sort the state minimizes its opportunity to assist in automotive development. While it is doing this it is needlessly checking, rather than encouraging, expansions in the automotive field that will enlarge revenues for the state in proportion to the freedom of growth they are accorded.



# Retail Sales Reveal Improved Tone

## Consumers Indicate Greater Buying Interest, Say Dealers

### Manufacturers to Regulate Their Output Programs by Conditions Found in Field

NEW YORK, Aug. 25.—With the new model season rapidly approaching an end and the outlook growing brighter for greater business in agricultural areas, the automobile retail sales situation shows distinct improvement. There continues a better demand by dealers, this reflecting a stirring of buying interest on the part of consumers. After their experience with accumulated stocks during the spring of the year, dealers are not disposed to take more cars than retail demand justifies. Manufacturers, on their part, will regulate production programs solely by sales conditions in the field.

Actual sales volume has not taken a strong upward trend but the increase is satisfactory and the outlook far more encouraging than it has been for some time. Contributing to the sales improvement no doubt is the fact that many prospective buyers have entered the market after waiting for the new models of cars to be announced.

What will develop in the agricultural zones will not affect current production. As demand comes from those sections, schedules will be advanced to meet it. Good reports, however, are being received by manufacturers from dealers throughout the Northwest and a buying movement of some extent may be expected to develop in a short time.

### Farmer to Be Factor

Through his inability to be an important factor in automobile sales up to this time, the farmer is expected to loom large in the future. What is equally encouraging to his return to the market is the fact that because of his long absence he will not bring a used car with him.

With production keeping pace with demand and with demand having a slightly better tone it would not be surprising if September, even with fewer working days, should show a stepping up from August production figures, which, in turn, probably will be somewhat above the July total.

Of the 262,876 cars and trucks produced in July, 237,652 were passenger cars, the decline in truck production that started in May of this year continuing and showing to an extent the hesitancy that prevails in commercial centers. Agricultural centers, however, will form a more important outlet for truck production than in the past with the result that the truck end of the industry may be expected to take a steady swing upward.

## He Makes His Own License Tag

CHARLOTTE, N. C., Aug. 25.—Counterfeiting automobile license tags to avoid payment of motor tax is the latest wrinkle unearthed among law violators in Mecklenburg county.

James Brown, negro, has been arrested and will be charged with attempting to defraud the state out of money.

A rural officer, arresting the negro on a charge of driving a car while drunk, noticed "something queer" about the license tag. Upon closer investigation he found that the tag was not official, with the numerals pressed into the metal but a tin plate with the numbers ingeniously painted on it. The numbers were exact duplicates of those on the regular plates and casual observation would not reveal the fraud.

## Heavy Run on Closed Models Reported at Oldsmobile Plant

DETROIT, Aug. 23.—Orders from dealers following the introduction of the refined Oldsmobile models have run heavily to closed models, the factory reports. Officials estimate that at least 70 per cent of production from now to January will be closed models. In several sections, the company states, this closed car demand is as high as 85 per cent for immediate delivery, despite the fact that it is now mid-summer.

"Dealers generally have been much impressed by the refined models," said Guy H. Peasley, sales manager, "and have increased their shipping specifications in many instances. Showing of the cars has attracted much favorable public attention, the dealers report, and they are expectant of a large fall business."

### OPENS BRANCH

TOLEDO, Aug. 25.—H. W. Lancashire, Toledo distributor for Dodge Brothers, Toledo, has announced the opening of another branch of his ready-to-serve salesrooms. A complete line of cars is on display at 3244 Monroe street in Auburndale, which is the new location. W. R. Dreher is branch manager.

### C. A. T. A. TO HOLD OUTING

CHICAGO, Aug. 25.—The Chicago Automobile Trade Association will hold an outing at Grand Beach, Mich., Aug. 28. Golf, horseshoe pitching, baseball and other sports are on the ticket for diversion with a banquet set for the evening.

## Locomobile Company Offers New Series of Its "48" Line

### Fundamental Design Remains Same but Many Refinements Are Incorporated in Models

NEW YORK, Aug. 25.—A new series of its Locomobile "48" known as the 19,000 series has been announced by the Locomobile Co. of America, Bridgeport, Conn. The fundamental design remains the same but numerous refinements in details have been made, probably the greatest number that have been incorporated in the Locomobile at any one time.

The new features include a removable torsion bar at the front end of the frame, Zerk positive chassis lubricating system, Catalyting of the combustion chamber walls, higher engine compression, aluminum alloy pistons, full pressure engine lubrication system with control in accordance with engine load, improvement in molded Raybestos clutch disks insuring more rapid polishing of disks, a gear-shift that operates easier and more quietly, speedometer drive from transmission, self-adjusting spring shackles, improved forward joint on radius rod, adjustable rear joint of radius rod, increased frame depth, etc.

Optional tire equipment is being offered as follows: The ordinary cord tires and 35x6.75 six-ply tires for those customers who want balloon tires. The company does not yet feel justified in standardizing balloon tires and will allow the public to specify the equipment it wants.

### MISS SWEET IN NEW FIELD

NEW YORK, Aug. 25.—Miss Marjorie M. Sweet has resigned from the foreign sales promotion department of El Automovil Americano and the American Automobile (Overseas Edition), both published by the Class Journal Co. to enter the automotive export business as a partner of Anton P. Kwast, representing the Pacific Rim Tool Co. and the All-Clear Windshield, Inc., abroad. Offices have been opened at 259 Broadway, New York City, and the new concern will specialize on automotive products. Miss Sweet is a sister of William M. Sweet, president and general manager of the Klaxon Co.

### McDARBY TO RETAIL FIELD

ST. LOUIS, Aug. 25.—Neil E. McDarby has severed his factory connections with Moon Motor Car Company as assistant sales manager to become associated with the Embleton Motor Co., San Antonio, Tex., Moon distributor. Mr. McDarby first served Moon as advertising manager, being advanced in April, 1923, to the post of assistant sales manager. He was honored with an informal dinner party Aug. 14 by the Moon organization in St. Louis.



## Northwestern States Have Good Outlook, Declares Vane

### N. A. D. A. Manager Finds Pleasing Business Prospects During Automobile Tour Across Country

SEATTLE, Wash., Aug. 25.—Business conditions in the Northwest from Minneapolis to Seattle are the most promising they have been in five years, according to C. A. Vane, general manager of the National Automobile Dealers' Association, who recently arrived here from headquarters in St. Louis.

Mr. Vane motored through Illinois, Wisconsin, Minnesota, South Dakota, North Dakota, Montana, Idaho and Washington talking to automobile dealers, bankers, farmers and business men en route, gathering their impressions of production and economic conditions.

#### Little Political Interest

"For an election year I found very little actual interest in political candidates as I came across," said Mr. Vane. "On the contrary the farmers are more interested in economical conditions than they are in politics. I expected to find the middle western states a hotbed of discussion, but it was extremely difficult to get any one out of business and on to politics for any length of time."

Road conditions throughout the Northwest were highly praised by the N. A. D. A. manager.

"The automobile business, like all other lines of endeavor, has experienced a stimulating awakening from the general improvement. New car sales have picked up in a highly gratifying manner since July 1, and used car sales have been steadier and more continuous. Because the present movement is a gradual development rather than a spurt, there is every indication that the next six months in the Northwest will provide greater opportunities for business profit than any previous similar period within the last five years."

#### EFFECT CONSOLIDATION

WORCESTER, Mass., Aug. 25.—A consolidation has been effected bringing together the Detroit Machine Tool Co., of Detroit, and the Norton Co., of this city, the latter one of the largest manufacturers of grinding wheels and grinding machines in the world, and the former producing a centerless grinding machine and controlling a new method of grinding which is said to reduce costs without sacrifice of quality and making it possible for unskilled operators to turn out accurate work.

No change in the business policy of the Detroit company is to be made. Harold W. Holmes will continue as president and general manager and the Detroit plant will continue in operation.

## Grade Mishaps Less Than on Level

WASHINGTON, Aug. 25.—Motor tourists who, through fear of accidents, have denied themselves the pleasure of visiting the high altitudes during their vacation traveling are advised by the American Automobile Association that an investigation just concluded shows more accidents are happening on straight highways than in mountainous districts.

It is pointed out in a preliminary bulletin on the subject that in a quarterly report made public by the highway department of Pennsylvania 146 accidents occurred on light grades as against 35 on dangerous grades, the difference being attributed to the tendency to speed where careful driving does not seem to be essential.

## Shifts in Retail Circle Take Place in Indianapolis

INDIANAPOLIS, Aug. 25.—A considerable shift in dealer and distributing circles is noted here. The Flint Motor Company has opened a distributing branch with Harry L. Archie as branch manager. This line was introduced to this territory a short time ago by the Charles E. Stutz Sales Company. Wholesale Moon distribution for Indiana will be in the hands of George Kanouse, one of the old line dealers and distributors who handled Stevens and other well known lines. This line was formerly handled for the state by the George A. Crane Motor Company until the death of Mr. Crane two months ago, after which his company went into the hands of a receiver.

Another change in lines handled has been announced by the Charles G. Sanders Company which has distributed Durant and Star for the state. These lines have been given up by the Sanders organization and no announcement yet made as to what cars his organization will sell in the future.

Aside from the failure of the Crane company following the death of Mr. Crane, and one receivership of a neighborhood dealer, there have been no dealer failures in this city in spite of strenuous sales conditions.

#### UPHOLSTERY ITS PRODUCT

FAYETTEVILLE, N. C., Aug. 25.—The Cotton Products Co., formed at Fayetteville, N. C., recently, is establishing a mill for the manufacture of automobile upholstery, and will start operations in the near future. Colonel Terry A. Lyon, of Washington, D. C., is president of the company, with W. D. McNeill in charge as general manager.

## Five-Day Week Vogue at All of Ford Manufacturing Plants

### Say Any Increases in Production Schedule Will Be Treated as Overtime Operation

DETROIT, Aug. 23.—The five-day work week is now an institution in the production plants of the Ford Motor Co., it has been learned from authoritative sources. All production plans are now based upon five-day operations. Any increase in this schedule will be only in cases of emergency and will be regarded practically as overtime operation.

With the rearrangement of its production facilities, which includes the changing of several departments from Highland Park to River Rouge and the expansion generally of all departments at the two plants, the company now has a production capacity of 8,900 cars daily. This capacity will reach 10,000 daily when all building and expansion projects now under way are completed.

#### Increased Efficiency

Increased efficiency in all departments has made this present capacity possible. Changes which have been under contemplation for several years, relative to the operations which could be carried on most successfully at the two plants, have now been carried out to a large extent. The result has been more room and greater efficiency in operations for all departments, together with a lessening of the handling operations between plants.

No changes in wage schedules are contemplated under the new work week arrangement. The difference in pay between five-day operation and the former full week is slight, requiring little, if any, adjustment of living arrangements. The effect upon the health and welfare of employees is considered as fully compensating for any slight loss in money return.

#### Hits Most Office Help

Fully 60 per cent of the office help will likewise be under the five-day work week provisions, these for the most part being the clerical help. Those holding the more important salaried positions are not affected. Vacations during the year are not affected, these being granted only to those holding the more important positions throughout the organization.

Any effect upon the overhead of plant maintenance occasioned by the application of the shorter work week is made up for by the increased efficiency of workmen and operations during the working period, according to the company's position. It will have in reserve constantly one full potential day's production to meet emergencies of demand and will be in better position at all times to regulate its operations.

## Michigan Owner Delivery in July Ran 19,173 Units

Figure Slightly Higher Than Same  
Month Year Ago and Above  
June, 1924

DETROIT, Aug. 25.—Deliveries to owners of passenger cars in the State of Michigan in July totaled 19,173 as compared with 18,051 a year ago and 16,476 in June this year. Trucks delivered to purchasers totaled 1,594 which compares with a total of 1,558 in July last year with 1,313 delivered in June this year.

Ford car sales in July were 9,438 or about 49 per cent of the total. Combined with other cars in the low priced field the total sales in this division were 67 per cent. Cars in the \$1,000 price class and under made up 81 per cent of the total volume in the State, the medium priced class getting 16 per cent and the balance going to the high priced field.

Of the month's total business of 19,173 cars, all but 187 of these were delivered by 30 manufacturers. This shows a considerable concentration of the business in the hands of fewer makers over the last year's period, though it is noteworthy that two of the leading companies numbered among the 30 were not manufacturing at this time last year.

Of the total truck volume of 1,594, 1,016 were Ford. Light trucks led by Ford were considerably in the ascendancy through there was a good volume of heavy duty business. Ford truck volume was 33 under July of last year, the gains for the month being scattered among other makers. Miscellaneous truck sales showed an increase over last year.

## SAY CHARGES ARE BASELESS

DETROIT, Aug. 25.—Officials of the Motor Wheel Corp. have not received formal notice as yet of the filing of charges before the Federal Trade Commission in which it is alleged that the company through its purchase of the Forsythe Bros. Co. has tended to reduce competition.

Substantially the company's position in reference to these charges, it is stated, is simply that competitive conditions have been affected but slightly and that there is no basis for the charges brought. A formal answer will be filed following the receipt of notice in which this position will be substantially stated.

## AGENTS FOR WILLS STE. CLAIRE

MARYSVILLE, Mich., Aug. 25.—Dealers who have recently taken on the Wills Sainte Claire line are: Bonne Terre Motor Company, Bonne Terre, Mo.; St. Claire Motor Car Co., Greensburgh, Pa.; Cowen's Garage & Sales Co., Mechanicville, N. Y.; Cowen's Garage & Sales Co., Saratoga Springs, N. Y.; Western Motor Car Co., Council Bluffs, Ia.; Doss Motor Company, Orlando, Fla.

O. K. Eysenbaugh, Tulsa, Okla., has been appointed distributor.

## 1,380 Are Refused Driver License

HARTFORD, Conn. Aug. 25.—The state motor vehicle commission refused drivers licenses to 1,380 applicants during the first six months of the present year. State police inspectors gave examinations to 28,853 applicants of whom 27,473 were certified to the motor vehicle department as eligible to drive.

The present examination of each applicant includes, consideration of the applicant's mentality, an actual driving test under observation, condition of the car, how the driver would proceed down hill to prevent skidding, an examination on the motor vehicle law, including technical question on the right of way and passing trolley cars, and so on.

The state police department report shows that many of the applicants who were turned down were unable to read.

## Impounding Talked at Capital to Solve Parking Problem

WASHINGTON, Aug. 25.—As a means of solving the parking problem here it has been suggested that the District of Columbia undertake to construct and operate a central downtown garage and supply parking space for private automobiles.

Commissioner Oyster and Inspector A. J. Headley, chief of traffic bureau, however, take the view that this move should be made by private capital and that the most logical remedy for traffic situation is the enactment of an impounding law. Both have announced their intention of fighting for this legislation at the December session of Congress.

## BARTLETT HEADS SPLITDORF

NEWARK, N. J., Aug. 25.—M. W. Bartlett was elected president of the Splitdorf Electric Co. to fill the vacancy caused by the death of John F. Alvord. Mr. Bartlett has been vice-president and general manager for several years.

Concerning the petition in bankruptcy filed by Harry D. Halsey, a stockholder, President Bartlett said:

"The affairs of the Splitdorf company are in excellent shape, as was brought out at our general meeting yesterday. We are perfectly solvent and our assets are twice our liabilities without including the valuation on land and buildings."

## PUBLIC GARAGE

BUFFALO, Aug. 25.—A \$200,000 public garage will be erected at Ellicott and Clinton streets, this city, by the Vendome Realty Corp., early this fall. It is said \$50,000 will be spent in equipment.

## Deal Pending With Canadian Capital for Roamer Purchase

Say Buyers Would Manufacture in  
Dominion But Not Discontinue  
Plant at Kalamazoo

KALAMAZOO, Mich., Aug. 25.—Acquisition of the Roamer Motor Car Company by a Canadian concern incorporated as the Roamer Motor Car Company, is indicated in a dispatch from Toronto, Ontario. It adds that while the Roamer car will be built in Canada, the new company will continue the operation of the Kalamazoo plant and locally produce the Barley "Six" and execute orders in various American cities for taxicabs.

When asked regarding the report, A. C. Barley, president of the Roamer Motor Car Company, refused to make any definite statements, other than to say: "A deal is pending for the purchase of the Roamer Motor Car Company by Canadian capital. I cannot give any particulars at this time. Later information will be available."

The only statement made by the Roamer Motor Car Company of Canada, according to the Toronto dispatch, is that the physical assets of the Kalamazoo company have been purchased for \$350,000 and that a factory containing 80,500 square feet of floor space has been acquired in Toronto for the purpose of building the Roamer Car.

The local plant has been practically idle for months, the only employees being a few retained in the office and those men needed in service work.

## WILL HANDLE ETHYL GAS

NEW YORK, Aug. 23.—An alliance between the Standard Oil Co. of New Jersey and General Motors has been formed through the organization of the Ethyl Gasoline Corp., a \$5,000,000 concern in which both are equal stockholders. The new company will take over the sale of ethyl fluid which in the past has been handled by the General Motors Chemical Co., and will continue the marketing policies of that company. The distribution of ethyl fluid will not in any way be confined to the Standard Oil Co. of New Jersey, or to any other single company or group of companies, it is announced.

For the purpose of introducing the new product to the trade the new corporation will take over the present business of the General Motors Chemical Co. and will immediately undertake to increase the production and enlarge the distribution of ethyl fluid. Both Standard Oil of New Jersey and General Motors are equally represented on the board of directors.

General counsel offices of the corporation are in the Cunard building, 25 Broadway, New York City.



## Hoover Patent Infringed by Lyon Bumper Declares Court

**United States Court Finds for American Chain Co. in Suit Against Weaver Co.**

SAN FRANCISCO, Aug. 25.—Finding for the American Chain Co. in its suit against the Chester N. Weaver Co. under the Hoover patent, No. 1,191,306. Owned by the American Chain Co., Judge Benjamin F. Bledsoe in the United States District Court, Northern District of California, holds that the invention covered by this patent antedates that of Lyon as shown in Patent No. 1,198,246, and that the type of Lyon bumper involved in this suit therefore infringes the Hoover patent.

Counsel for the defense has given notice that the case will be appealed and carried to the United States Circuit Court of Appeals for the Ninth District.

The suit was brought against the Weaver company because it was selling Lyon bumpers made by the Metal Stamping Co. of New York, patents on which are owned by Lyon & Wilson. The case has been hard fought, with a brilliant array of legal talent on both sides, the American Chain Co. being represented by Frederick S. Duncan of New York and Charles E. Townsend and John H. Miller of San Francisco, while the defense has Drury W. Cooper of New York, William W. White, Carey Van Fleet, Senator Samuel M. Shortridge and William G. McAdoo. The case was heard by Special Master Harry M. Wright, whose first finding held that the Lyon bumper infringed the Hoover patent. The case was reopened later but again the special master upheld the Hoover claims.

### Court's views

The present decision of Judge Bledsoe is an approval of the master's report.

"There can be no doubt in my estimation but that Hoover's invention, insofar as it related to a continuous resilient spring bumper effect, was both entirely novel and exceedingly useful," Judge Bledsoe says in his decision. "Its novelty and merit entitle it to a reasonably substantial range of equivalency. That it is infringed by the defendant's device, plural in members but unitary in structure and effect, is equally clear. I do not discover any 'equities' in defendant's case, as contended for, sufficient to invalidate plaintiff's cause of action."

Touching on the remaining question as to priority of invention and reduction to practice as between Hoover and Lyon, Judge Bledsoe held that the former had antedated the latter in "reduction practice."

Said Judge Bledsoe:

"All in all, I am of the deliberate conviction that the testimony of Hoover to the effect that he did reduce this invention to practice in 1910, as claimed by him, is sustained by the corroborative proofs and sufficiently meets the burden

## Crosses to Mark Funeral Cars

COLUMBUS, Ohio, Aug. 25.—The Columbus Automobile Club has come forward with a plan to use a black cross in marking various vehicles included in all funeral processions in order that ordinary traffic will not break through the processions.

The emblem is to be attached to the radiator of each car in the procession. Each emblem is to carry a number which will aid in arranging the procession.

It is believed that the motoring public will respect the black crosses and refrain from disrupting the consecutive order of the procession.

imposed upon him under the decision in the Willard case. The findings of the special master as upon the evidence, together with his report and recommendations as to the validity of the Hoover patent are approved. In conformity therewith, and in furtherance thereof, a decree containing the usual provisions, to be prepared by the plaintiff's counsel, will be entered as record."

### DEFENSE TO APPEAL

NEW YORK, Aug. 25.—Referring to the California decision in the American Chain Co.-Chester N. Weaver Co. case, John F. Galvin, president of the Metal Stamping Co. declares that the attorneys for the defense have been instructed to carry the case to the Circuit Court of Appeals in the California district.

"In the event that that court sustains the decision of the lower court," said Mr. Galvin, the case will be carried to the United States Supreme Court as such decision would be in conflict with the one rendered by the United States Circuit Court of Appeals, New York District, in 1918, in the suit of the Metal Stamping Co. against the Hartford company in which decision the Lyon patent was upheld.

"I might add that the decision effects only the old type of loop-end bumper which has been almost entirely replaced by the parallel-bar type now in general use."

### REORGANIZE NASH AGENCY

HATTIESBURG, Miss., Aug. 25.—Formation of the Hattiesburg Nash Motor Co. as a reorganization of the former Nash distributors at Hattiesburg has been recently announced, with R. P. Knight in charge as president and manager of the business. Guy Allsup is secretary and treasurer. The company will distribute the Nash line in the Hattiesburg territory in Southern Mississippi.

## Auburn Raises List Prices \$100 on All Models of Line

**On "6-63" Chassis Balloons and Four Wheel Brakes Are Offered at Additional Cost**

AUBURN, Ind., Aug. 25.—An advance of \$100 in the list prices of both the "6-63" and "6-43" models of the Auburn cars was recently announced by the Auburn Automobile Co. On the "6-63" chassis balloon tires and four wheel brakes may be supplied as optional equipment at an additional cost of \$60 and \$65 respectively.

With the exception of the English Coach which has balloon tires as standard equipment, all models on the "6-43" may be equipped with balloons at \$50 extra. The table below shows the old and new prices on both models.

	Old Price	New Price
"6-43"		
5 Pass Spec. Touring.....	\$1,295	\$1,395
5 Pass Sport Touring.....	1,365	1,465
5 Pass Touring Coupe.....	1,595	1,695
5 Pass English Coach.....	1,845	1,945
5 Pass Sedan.....	1,695	1,795
"6-63"		
5 Pass Touring.....	1,695	1,795
5 Pass Sport Touring.....	1,935	2,035
5 Pass Sedan.....	2,445	2,545
5 Pass Brougham.....	2,245	2,345
7 Pass Sedan.....		2,545

## Hyman Quits Post as Head of Stutz Motor Car Sales

INDIANAPOLIS, Aug. 25.—Herbert R. Hyman has resigned as sales and advertising manager of the Stutz Motor Car Co. of America, a post he has filled for the past two years. His future plans will not be announced until his return from a vacation he is enjoying in Canada.

President W. N. Thompson has assumed personal charge of Stutz sales, assisted by E. T. Klee, recently appointed assistant to the president after several years as a Stutz executive.

A gratifying increase in dealer orders recently is reported by President Thompson, who expects that improving national and international general trade will have a very marked influence on the motor industry.

### NAMED BY PAIGE-JEWETT

GREENVILLE, S. C., Aug. 25.—The Knox L. Haynesworth Motor Co., 110 College street, Greenville, S. C., has been named distributors in that section of South Carolina for the Paige and Jewett lines, it has been recently announced by the Paige-Jewett Sales Co. of Atlanta.

### SALES SET RECORD

ST. JOHN, N. B., Aug. 25.—20 per cent increase in motor sales over previous years is shown in returns for the Province of New Brunswick up to June 15. Lighter cars have been the favorites.



## Car Output in July 60,000 Under Month 1923, Says U. S.

### Commerce Department Estimates Production of Passenger Vehicles for Last Month at 237,652

WASHINGTON, Aug. 25.—Production of passenger automobiles during July just passed dropped approximately 60,000 from the 1923 July production but is an increase of approximately 12,000 over the 1922 July production, the Department of Commerce has just announced here. The figures are based on reports received from 206 manufacturers, 99 making passenger cars and 136 making trucks and 29 making both passenger cars and trucks.

The total production of passenger cars in July, 1924, is given at 237,652 as compared with 297,413 for July, 1923, and 225,103 for July, 1922.

A decrease of approximately 5,000 is also noted in the July, 1924, production of trucks from the July, 1923, production which was 30,692, but a gain of about 3,000 over the July, 1922, truck production. The total number of trucks produced during July just passed is given at 25,224, making the car and truck output combined 262,876, which is slightly higher than the N.A.A.C. estimate of 258,200, but practically the same as the figures quoted in the unofficial survey made in the first week of August by the Class Journal Co.

It is explained by the Department of Commerce in releasing the statistics that the data for earlier months include 15 additional manufacturers now out of business, while July data for eight small firms were not received in time for inclusion in this report.

## Wills Ste. Claire Beats Train Time on Toledo-Montreal Run

MONTREAL, Can., Aug. 25.—The Wills Ste. Claire car, which left Toledo one minute after midnight recently on a straightway run to Montreal with the intention of making the 775 miles in 20 hours, or an hour faster than the fast mail train, arrived in Montreal just 19 hours and 59 minutes later at the Mount Royal Hotel, having succeeded in beating the train by slightly more than an hour. The average speed, including stops, was 38½ miles an hour. Those in the car for this record run were Messrs. C. L. Rood, manager, and Sim Harris, of the Toledo Wills Ste. Claire agency, with G. R. Pulford, sporting editor of the Toledo Blade.

### JOINS PACKARD STAFF

BALTIMORE, Aug. 25.—The Zell Motor Car Co., Baltimore, Packard distributor, has announced appointment of C. D. Weatherly, president of the Baltimore Service Co., as a member of its sales staff. Mr. Weatherly retains his office with the Baltimore Service Co.

## DEALER FIELD EXPANDS

(Continued from page 11)

dangers and checked business in proportion, their actual requirements will be relatively less than those of sister states that are forced to earlier and more extreme measures. But in time these states will be forced with the same necessity. Let it be hoped that they will have the wisdom and vision to provide for such inevitable needs before the hour of reckoning, such as has already dawned in untimely descent upon many sections of the United States.

It goes without saying that the day of 38,000,000 motor vehicles, seen in the future by the government's census men, will demand vastly better highway accommodations than America affords at the present time.

Were that many motor vehicles in operation right now, with the meager highway facilities that we have, the country's plight would be nothing short of a calamity. While there has been much good road building it has not gone ahead in proportion to the expectancy for needed traffic accommodations.

## Metropolitan New York Took Brace in July Says Analysis

NEW YORK, Aug. 25. — Recovery from the June depression in the Metropolitan district took place in July, according to the statistics compiled by Sherlock & Arnold, publishers of the Automobile Sales Analysis. Registrations of new cars in July aggregated 12,043 as compared with 9605 in June. Total sales for the first seven months of this year amounted to 64,022 as against 60,177 in the same period last year.

Recapitulation for the seven months of 1924 follows:

	Medium and Low Priced	Higher Priced
January .....	3,548	292
February .....	3,814	357
March .....	8,179	674
April .....	12,133	972
May .....	11,597	808
June .....	8,996	609
July .....	11,376	667
Total .....	59,643	4,379

In the low and medium priced field, four cars report sales of more than 5,000 for the seven months of this year, three others in excess of 2,000 and eight others of more than 1,000. Two makes of cars continued to hold the lead in the higher priced field with registrations above the 100-mark but below 500.

### BACK FORM CANADA

COLUMBUS, Ohio, Aug. 25.—J. O. McDonald, manager of the used car department at the Columbus Buick Co., 186 E. Long St., has just returned from a two weeks fishing trip in Canada.

## 13,922 Authorized Ford Dealers Throughout World

### Establishment of Branch and New Companies Puts Foreign Organization to Record Size

DETROIT, Aug. 25.—Authorized Ford dealers throughout the world now total 13,922, an increase of 831 during the last year, the Ford Motor Co. says in an official statement. Expansion of foreign sales and service organizations has reached record proportions this year with the establishment of three new companies and a branch.

Dealers in the United States now number 9,566 and foreign dealers 4,326. The three new companies established abroad during the year are at Stockholm, Rotterdam and Port Elizabeth, South Africa, the last named being an offspring of the Ford Motor Co. of Canada, Ltd. The new branch is at Santiago, Chili. These new companies bring the total of foreign incorporations to 11 and there are 12 branches. Eight of the branches are of the Canadian company, all these but the Port Elizabeth branch being in Canada. There is a slight distinction in the ownership of the foreign branches and companies. The branches are owned by the Ford Motor Co., the foreign companies being owned by the Ford family but operated by the company. The Ford Company of Canada is a stock company in which the Fords hold a principal interest, the branches of this company being owned and operated by it.

## Reo Agencies in Cotton and Wheat Belts See Good Trade

DETROIT, Aug. 25.—Distributors in the wheat and cotton growing sections of the country are in the best frame of mind in several years and optimistically predict a big business, the Reo Motor Car Co. reports. The corn belt is not doing so well as untoward weather has not helped the outlook, it is stated, but a late fall and hot weather will bring the corn crop high.

Clarence Triphagen, assistant sales manager, who has returned from the East, declared distributors in that section are increasing their allotments. This increase averages 20 per cent more than in 1923. The eastern outlook is good generally, Mr. Triphagen said, and New England is selling increased numbers of cars in the rural districts.

### TO MAKE FLINT AT LEASIDE

LEASIDE, Ont., Aug. 25.—R. H. Mulch, general manager of the Durant Motors of Canada, Limited, on his return recently from Flint, Mich., announced that he is perfecting arrangements for construction of the Flint Six soon at the Leaside plant of Durant Motors of Canada, Limited.

## N. A. D. A. Going Ahead With National Sales Congress Plan

**Officials to Hold Atlantic City Meetings and Proceed Regardless of N. A. C. C. Action**

ST. LOUIS, Aug. 25.—Officials of N. A. D. A. have decided to go ahead with the plan for the National Sales Congress to be conducted at Atlantic City, Sept. 29 and 30, and the program has been completed according to an announcement. The dates as fixed are one week later than originally proposed when N. A. D. A. appealed to the National Automobile Chamber of Commerce for co-operation in the sales congress program.

It was decided by N. A. D. A. to go ahead with at least a few of the meetings after automobile dealers throughout the country had made insistent demands that some meetings be held regardless of what action should be taken by N. A. C. C. on the proposal that the manufacturers should bear a part of the \$50,000 campaign costs. Funds have already been made available by N. A. D. A. for use in the sales congress effort and the decision to proceed without waiting for N. A. C. C. to act in September and October was caused by the need for immediate action. Officials of N. A. D. A. say that if they waited for the N. A. C. C. decision, before preparing their program and making arrangements, it would be impossible to obtain speakers, obtain hotel accommodations and other items that are necessary in a project of this size and character.

### Feel Sure of Support

Such great interest has been shown throughout the industry in the sales congress program, N. A. D. A. executives say, that they feel sure N. A. C. C. will be impressed with the program and will follow the advice of some of its leaders already given, that the program should be financially supported.

If the directors of N. A. C. C. in a meeting in September in New York approve of the proposal that N. A. C. C. appropriate \$25,000 to bear half of the cost of the entire program, it will mean that the directors will recommend that appropriation to the members of the Chamber which meets in New York in October and it is believed that a recommendation by the Board of directors will be all that will be needed. Such action would provide funds for the continuance of the sales congress programs, inaugurated at Atlantic City, Sept. 29 and 30.

The first group of sales congresses to be arranged following Atlantic City are: Boston, October 1 and 2; Buffalo, October 3 and 4; Chicago, October 6 and 7; Milwaukee, October 8 and 9; Minneapolis, October 10 and 11.

The programs as arranged for these six meetings will be such that the entire list of 25 can be carried through without any change if the funds for the work

## Essay Prize Won by California

MARYSVILLE, Mich., Aug. 20.—Wm. C. Moffat, of the Western Motors Company of Los Angeles, won the Wills Sainte Claire Essay Contest, conducted by the Wills Sainte Claire factory to determine just how well Wills Sainte Claire salesmen knew the product they were selling.

J. E. M. White, of the Wills Sainte Claire Company of Illinois, Chicago, won second prize and F. S. Luqueer, of the Western Motors Company of Los Angeles won third prize.

Wills Sainte Claire salesmen in every section of the country competed for the three prizes and many interesting papers were submitted.

become available. Advertising and publicity matter announcing the first meetings is already going forward direct to dealers from N. A. D. A. headquarters here.

## Jewett Price Advance Runs \$50 to \$70 on Full Line

DETROIT, Aug. 25.—A price increase on all Jewett cars ranging from \$50 on the standard sedan to \$70 on the touring models was announced by the Paige-Detroit Motor Car Co. on Aug. 15. The following table gives the old and new prices:

	Old Price	New Price
5-pass. touring .....	\$1,065	\$1,135
5-pass. special touring .....	1,220	1,290
3-pass. business coupe .....	1,250	1,310
5-pass. sedan .....	1,495	1,545
5-pass. special sedan .....	1,695	1,745
5-pass. brougham .....	1,325	1,385

### MAXWELL DROPS TRUCK

DETROIT, Aug. 25.—The discontinuance of the manufacturing of the Maxwell one and one-half ton truck has been announced by the Maxwell Motor Sales Corp. With the elimination of this model the Maxwell Corp. will concentrate solely on the Chrysler and Maxwell passenger cars.

### BUILD LARGE SALES PLACE

MINNEAPOLIS, Aug. 25.—A new home for Buick sales is being constructed by the Pence Automobile Company, of Minneapolis opposite its main service and sales building. The new structure will cost \$75,000 and measure 100 feet by 180.

### WILL BE DISTRIBUTORS

DRESDEN, Tenn., Aug. 25.—The Brooks Garage Co., of Dresden, Tenn., has been appointed distributors in that section of Tennessee of the Ford and Lincoln line, it has been recently announced.

## Detroit Chevrolet Dealers Adopt Insurance Guaranty

**Plan Protects Time Payment Buyer Who Suffers Incapacitation Before Debt Is Cancelled**

DETROIT, Aug. 25.—Detroit Chevrolet Dealers' Association, comprising all of the Chevrolet dealers in Wayne County, has adopted the deferred payment guaranty insurance plan, under which time payment buyers are protected against inability through illness or accident to complete payments on their cars. The plan is that of the Commercial Casualty Co. of Newark, N. J., and applies to all buyers who wish this protection.

By use of the plan the association expects to relieve a certain part of the hesitancy due to fear on the part of the buyer, that illness or accident may prevent his completing payment and losing whatever payments have been made. The insurance does not apply in the case of the buyer unable to meet payments through loss of work or part time employment. It is simply a health and accident policy applying on car payments.

Payments are made by the insurance company through the duration of the period in which the injured is incapacitated through illness or accident, the minimum period being two weeks. In the case of death the car payments are completed and the car turned over free of indebtedness to the buyer's beneficiary or estate.

Arthur H. Goodman, manager of the Chevrolet retail store here and executive secretary of the association, says the plan meets a definite need and therefore should help sales. Many persons desirous of buying cars, he said, have held off due to fear of being unable to complete payments because of illness, and thereby losing whatever they have already paid. This resistance is removed by the insurance and the association members are confident, he said, that considerable business will result through its application.

### ABROAD FOR MARMON

INDIANAPOLIS, Aug. 25.—Frank L. Hambly has sailed for Europe, where he will represent the Nordyke & Marmon Co. in establishing foreign dealer connections. His itinerary includes England, Belgium, Holland, Denmark, Sweden, Finland, Poland, Germany, Czechoslovakia, Austria, Switzerland, France, Italy, Greece, Spain and Portugal. His tour will last three months.

### STOP TRACTOR MAKING

MANSFIELD, O., Aug. 25.—The Aultman & Taylor Mach. Co., veteran manufacturer of farm machinery, has sold out and discontinued all manufacturing operations on the various models of "Aultman T" tractors.



## October Is Month Selected For Annual Show at Oakland

### Dealers Association of California City to Depart from Policy of January Displays

OAKLAND, Cal., Aug. 25.—The Oakland Motor Car Dealers' Association voted to hold the annual automobile show, which has heretofore been a January feature, beginning on Oct. 4, 1924, thereby making it the first automobile show to be held on the Pacific Coast in the 1924-1925 selling season. Although the place has not been decided upon as yet, it is expected that the Oakland Seventh Annual Auto Show will be held as last year in the Civic Center Auditorium, which accommodated over 23,000 people during the week of Jan. 12-19, 1924, when the sixth annual motor exposition was staged. Well over 35,000 people are expected to visit the October show, according to word from the offices of Robert W. Martland, manager, who states that the Fall showing idea is bound to attract greater throngs from both sides of the San Francisco Bay than did the remarkably successful last Winter affair.

A complete showing of the latest products of the manufacturers of the country is assured. Practically all of the leaders have announced their 1925 lines, and by Oct. 4, the opening date, full showings of cars will be received in Oakland. The city dealers here believe that the show will do much to stimulate Fall business and provide a buying impetus which will carry on through the Winter and set up new sales records. They are agreed unanimously, and even now are making plans for the Seventh Annual Auto Show.

From a standpoint of motor car sales, Oakland occupies an enviable position as the business center of Alameda County, which ranks third consistently in county sales listings, being topped only by Los Angeles and San Francisco counties. These factors point to a successful auto show this Fall.

### TIRE BILL KILLED

ATLANTA, Ga., Aug. 25.—The Atlanta Automobile Association has announced that, through the efforts of the association's legislative committee, headed by William L. Mathers, the bill introduced before the Georgia State Legislature, now in annual session in Atlanta, to compel manufacturers of tires to stamp the date of manufacture on all automobile tires sold in Georgia has been defeated. The association took the stand that such a law would work an undue hardship on both dealers and manufacturers.

### OPEN NEW HOME

WAUPUN, Wis., Aug. 25.—Charles Heideman, Waupun, Wis., Overland, Willys-Knight, Paige and Jewett dealer, has opened his new sales and service building at Fond du Lac and Watertown streets.

## All But Page 'Em In This Hotel

DALLAS, Tex., Aug. 25.—Dallas has another big "auto hotel." The "Parkmoor" has been completed and occupied. The new building covers a half block and is located on the principal driveway of the city. W. J. Lee, B. H. Giles and O. H. True are proprietors of the hotel. The parking space is large. Connected with the hotel is a complete service station.

Automobiles are "registered" and "checked out," much like persons are at the big hotels of the city. They "are fed oil, grease and gas" and are given their "daily baths" if the owners desire. It is a place operated on both the "American and European" plan.

## Stewart-Warner Condition Strong Despite Surplus Drop

CHICAGO, Aug. 25.—A strong financial condition is revealed in the Stewart-Warner Speedometer Corporation's balance sheet as of June 30, 1924, despite the necessity of a withdrawal from surplus to meet dividend requirements. The ratio between current assets and current liabilities was almost  $7\frac{1}{2}$  to 1, with working capital amounting to \$7,824,368 as compared with \$8,650,848 at the end of the first quarter. Net earnings for the second quarter are put at \$512,850, equivalent to \$1.07 a share on the 474,990 no par value shares outstanding with a deficit for the second quarter of \$669,555 after dividends. This compares with a surplus of \$296,249 after dividends in the first quarter and a surplus of \$926,570 in the second quarter, a record period, of last year. A large reduction was made in the company's accounts and notes receivable, the figure for the end of the second quarter being \$1,294,472 as against \$3,154,764 at the end of the first quarter and \$2,739,186 as of June 30, 1923. Current assets are put at \$9,067,781 and current liabilities \$1,243,413.

### OLDSMOBILE DEALERS GATHER

ST. LOUIS, Mo., Aug. 25.—Most of the 104 associate Oldsmobile dealers in Eastern Missouri and Southern Illinois attended a meeting in St. Louis held by the De Luxe Auto Co., Oldsmobile distributors, to introduce the new Oldsmobile models. A feature of the convention was a banquet at the roof garden of the Melbourne Hotel at which addresses were made by Phillip H. Brockman, president of the company, G. T. Willett, general manager and R. S. Hudson, St. Louis manager of the General Motors Acceptance Corporation. The visiting dealers drove away about 60 new models.

## Report Tire Companies Add to Forces Despite Skeptics

### Fears That Business Improvement Will be Brief Fails to Check Several Akron Concerns

AKRON, O., Aug. 25.—Despite a belief that the material increase in automobile tire business which was started recently will not last more than 60 days, some of the more important tire manufacturing companies continue to add men as rapidly as they can be obtained.

It is reported, without official confirmation that one of the largest producers expects to add at least 2,000 men during the next two weeks. The company regarding this report is in general circulation states that it is adding men but that it does not know how many will be taken on nor does it wish to be quoted as stating that it is taking on additional help.

The same company is reported to be planning an increase in wages for some of the more experienced tire men in an effort to prevent their going to competitors both in and out of Akron.

It is estimated that the daily production of tires at the present time is in the neighborhood of 80,000 and that before the present flurry is over production may reach 85,000 a day.

That this unprecedented summer business is not an unmixed good is the opinion of some of the most important manufacturers. These leaders state that the cost of placing the plants in condition to take care of the large volume of business, including the hiring and breaking in of additional labor is so large that the same volume of business does not produce the same volume of profit as is done during the regular production seasons.

These manufacturers now admit that it was a mistake to reduce tire production a month early as was the case last spring. Had production been maintained until the usual time at the regular figure the present rush with its accompanying costs would have been avoided, these makers say.

### SELDEN EXECUTIVE RESIGNS

ROCHESTER, N. Y., Aug. 25.—P. K. Hexter, vice-president and sales director of the Selden Truck Corp., has tendered his resignation to the receiver of the Selden company, to take effect immediately. Mr. Hexter has no definite plans for the future.

### PUSH SAFETY MOVEMENT

MEMPHIS, Tenn., Aug. 25.—The Safe Drivers Club and the Memphis Safety Council are putting on an elaborate campaign for the prevention of traffic accidents. A membership roll for the general public has been opened.

## Cord Tires Continue to Gain Over Fabrics in Users' Favor

Statistics Compiled by Rubber Association Show Former Advances Materially in Output Strength

NEW YORK, Aug. 25.—Cord tires continue to gain in favor at the expense of fabrics, according to statistics compiled by the Rubber Association of America, which show the former gaining in production strength, while the latter are continually slipping. June figures show that in comparison with the same month last year cords increased in production 14.5 per cent and shipments 48.5 per cent, while fabrics decreased 49.4 per cent in production and 38.8 per cent in shipments.

In June there were 2,031,002 cords produced and 2,001,113 shipped, of which 1,530,872 were high pressure and 500,130 balloons produced as against 1,683,898 and 317,215 produced. With fabrics there were 598,740 casings produced and 752,030 shipped. Inventory totaled 6,156,537, production 2,629,742 and shipments 2,753,143.

June inventories included 4,302,284 cords and 1,853,253 fabrics in comparison with 4,279,419 cords and 2,033,774 fabrics in May. In the case of the latter this is a decrease of 8.8 per cent and with the former an increase of .5 per cent.

The total for the first half of the year shows 18,901,464 casings of all types produced and 17,202,622 shipped.

Reporting on the second quarter, the association finds that the total sales value of automotive rubber products shipments was \$139,899,000 in comparison with \$133,652,000 in the first quarter and \$142,818,000 in the second quarter of 1923. This required the use of 56,323 tons of crude rubber, as against 65,253 in the same period last year.

As of June 30, there was a grand total of 64,418 long tons of crude on hand and 24,480 afloat.

### REO FOREIGN TRADE JUMPS

DETROIT, Aug. 25.—The overseas business of the Reo Motor Car Co. for the first seven months of this year totaled 1645 vehicles, almost double the total of 882 for all of last year period. The company reports Australia and South Africa as the heaviest buyer and largely increased business in South and Central America. Good business is reported from England and an opening of business with central European countries.

### NEW FORD AGENCY

SALT LAKE CITY, Aug. 23.—The City Motor Sales Co. is the name of a new concern here that will handle the Ford car. E. R. Payne and C. B. McDonald are president and secretary-treasurer of the company, respectively.

## Toledo's Motordom 20 Years Ago

TOLEDO, Aug. 25.—The following item was clipped from a Toledo daily paper of 20 years ago this month:

"It is estimated that there are 250 automobiles in Toledo.

"Travelers say that, in proportion to population, Toledo has more automobiles than any other city.

"Peter Gendron brought the first automobile to Toledo in 1898. It was equipped with a six horsepower engine. Mr. Gendron now owns a 20 horsepower car."

Toledo now in 1924 has more than 75,000 automotive vehicles.

## Yellow Profits Reported for Second Quarter of the Year

CHICAGO, Aug. 23.—Net profits of \$795,458, after all charges, equivalent to \$1.32 a share earned on 600,000 shares of \$10 par value Class B stock outstanding—as against \$1,005,022, or \$1.67 a share, in the first quarter of the year—are reported by the Yellow Cab Manufacturing Company for the second quarter of the year ending June 30. For the half year period ending June 30, the net totaled \$1,800,480, amounting to \$3 a share. A surplus of \$300,480 remained after the payment of dividends. Net profits in the first half of 1923 amounted to \$2,062,586, or equivalent to \$3.45 a share on the present capitalization.

The Chicago Yellow Cab Company, which operates taxicabs, reported net profits for the second quarter of \$515,929 after all charges, equivalent to \$1.29 a share on the 400,000 shares of no par value stock outstanding—as against \$598,854, or \$1.49 a share in the first quarter. Net profits for the first half totaled \$1,114,783, or \$2.78 a share—as against \$1,040,449, or \$2.60 a share on the present capitalization in the first half of 1923. In the first six months of 1924 there remained a surplus after dividends of \$314,783.

### MORE CLEVELAND AGENCIES

CLEVELAND, Aug. 25.—The following distributors are announced by the Cleveland Automobile Co.:

The Hughes Motor Sales Co., 6408 Walworth Road, Cleveland, O.; R. & C. Motor Co., Lexington, Ky.; Wolfenden Automotive Co., Nashville, Tenn.; Johnson Supply Co., Inc., San Antonio, Tex.; Alexander Pompeo, Brockton, Mass.; Jackson & Kedzie Motor Service, 3206 Jackson Boulevard, Chicago, Ill.; D. W. Roberts, Long Beach, Cal.; Luther M. Wright, Norwalk, Conn.; St. George Garage, Inc., Tomkinsville, N. Y.; William Singleton, Auburn, N. Y.; James A. Mulligan, 436 South Broadway, Yonkers, N. Y.

## Charlotte Dealers Expect Good Tone to Motor Trade

Believe Force of Textile Depression Has Been Spent and Conditions Will Improve

CHARLOTTE, N. C., Aug. 25.—Splendid business conditions are promised for late summer and early fall, with marked improvement over the early summer already noticeable, according to unanimous expression of Charlotte automobile dealers. The dealers agree that effect of the textile depression which has been felt in the automobile business is gradually being lifted, giving indication of a fine business this fall.

Interviews with a number of dealers and distributors brought favorable expressions as to business indications.

B. D. Heath of the B. D. Heath Motor Company, said: "Our business is gradually improving all the time and the future seems unusually bright. The fall looks good with a prospective flourishing business."

Z. B. Trexler, Rust Motor Company, said: "We have sold more cars this season than ever before locally, but out in the territory we have felt a considerable falling off. Now things are looking up among all our dealers. We expect a booming business in the fall."

J. P. Harris, Burwell-Harris Company: "We have had good business all summer. Our new models, now showing, are bringing in a large business. The reception given the new cars leads us to look for still greater volume of business in the fall. Out in the territory conditions are getting better and there is every reason for general optimism."

Calendar Newton, Booth-Newton Company: "Business looking much better, both wholesale and retail. Have had good business the past few weeks and look for a continuation of good business throughout the fall."

Edgar S. Sehorn, of Wadsworth-Sehorn Co.; J. H. Bolton, of the Flint Motor Co.; J. H. Ham, Packard Service; George E. Wilson, Wilson Motor Co.; Fred Anderson, Pyramid Motor Co.; H. S. Dowling, Dowling Motor Co., and A. K. Blakeley, Carolina Motor Company, all make optimistic statements on the general order of the specimens quoted.

### POERTNER BACK TO GAME

NEW YORK, Aug. 25.—William C. Poertner, for years one of the most prominent of the Metropolitan dealers, has returned to the industry after several months of retirement, taking on, through the Poertner Motor Car Co., of which he is president, the New York distributorship for Master bodies for Ford cars, made by the Ohio Body Co., of Cleveland. Mr. Poertner represented the National in New York over a long stretch and up to last spring controlled a large territory for Durant and Star cars.



## Ford Mines Will Distribute Coal in Northwest Market

### Plan General Sale of Large Annual Output Besides Supplying Various Company Plants

DETROIT, Aug. 25.—Sale of coal from the Ford mines will be entered into by Ford Motor Co. in the Duluth and northwest district with the establishment of its new lake freighters in regular service between the River Rouge foundries and the iron and timber properties in the northern peninsula. The principal purpose in entering the coal market in the northwest is to provide full cargoes for the freighters both ways on the up trip.

The freighters will carry 50,000 tons of coal monthly. Part of this will be delivered for use at the Ford properties in Michigan, the bulk, however, being delivered at Duluth, from there in turn a part will be shipped to the Ford properties at the Twin Cities and down the Mississippi to St. Louis. There will be, when shipping is fully established, from two to three hundred thousand tons for general sale annually. On the down trip the freighters will carry full cargoes of ore from the Ford mines to the River Rouge plant.

#### Aid to Northwest

The coal sold in the general market at Duluth is in the nature of a sale of a Ford by-product, the company declares, besides permitting carrying full cargoes of an easily loaded commodity on the up trip the company regards the movement as aiding the northwest in one of its most important problems. The price of the coal will be based similarly to the price on other Ford by-products, production cost plus fair profit and cost of transportation. Prices in the general coal market will not affect Ford prices.

W. B. Mayo, chief engineer of the Ford Motor Co., formally accepted possession of the Superior Coal & Dock Co., Bay front property at Duluth when he arrived on the Benson Ford, the first Ford boat to enter the harbor. It carried 12,000 tons of bituminous and with its sister ship will make two round trips monthly, carrying similar cargoes. Sales offices will be opened in Duluth and Twin Cities, Mr. Mayo said, as soon as the company is ready to make deliveries. The company is not entering the coal business insofar as any other section than the northwest is affected.

#### FORD TO EXTEND ROAD

WASHINGTON, Aug. 25.—Henry Ford has been authorized by the Interstate Commerce Commission to construct approximately 56 miles of new line for his Detroit, Toledo and Ironton railroad at a cost of about \$7,500,000. The Commission also authorized issuance of first mortgage bonds to raise funds. The new line will shorten haulage distances over the Detroit, Toledo and Ironton.

## Most of Chandler Bonus in Homes

CLEVELAND, Aug. 25.—The major portion of the \$200,000 bonus which the Chandler Motor Co., distributed recently to employees went to reduce the principal and to pay interest on mortgages on homes.

A careful canvass of the purposes to which the bonus was put revealed this. It is especially significant that the men who receive the bonus are paying for homes.

Quite a large sum of the bonus was devoted to the payment of hospital and doctor bills.

Very, very little, if any of this \$200,000 bonus, was squandered and was not put to a useful purpose, according to Employment Manager Gorbet of Chandler Co.

## Promote Scheme for Mile Motor Course at Rochester

ROCHESTER, N. Y., Aug. 25.—Rochester will have a mile track on which will be staged automobile races equal to those held annually at Altoona, Santa Barbara and Kansas City, if the plans of two interests here materialize. The track would cost approximately \$300,000 to build, according to its sponsors.

Edgar F. Edwards, secretary of the Rochester Exposition and Horse Show, has already taken an option on a site here with Harry Ruppert, local real estate dealer. Another site is being sought by Horace F. Murphy, of Syracuse, who conducts the 250 mile race at the State Fair annually. If the track is built the greatest drivers in the country will be brought here to race.

#### ROWE STARTS COMPANY

NEW YORK, Aug. 25.—W. L. Rowe, for more than ten years associated with General Motors and Durant interests in a manufacturing and supervisory capacity, has severed his connection with Durant Motors, Inc., as of August 1, and has organized the firm of W. L. Rowe, Inc., with offices in the Fisk building, New York City. Mr. Rowe's organization will be special representatives for a number of the leading automotive accessory and parts manufacturers of the country.

#### LEASE HALL FOR SHOW

OTTAWA, Ont., Aug. 25.—The success of the automobile show to be held in connection with the Central Canadian Exhibition at Ottawa September 5-15 is practically assured, according to automotive interests. The automotive industry has obtained a lease for the entire main section of Howick Hall and the new annex, which gives it full control of the building.

## Hoover's Safety Plans Are Nearing Point of Maturity

### Technical Committees Expected to Make Final Reports by Late September or October

WASHINGTON, Aug. 25.—Practical assurance that Secretary of Commerce Hoover's plans for a National Policy of Street and Highway Safety are rapidly reaching maturity was given here at the initial meeting of the Committee on Public Relations when Colonel A. B. Barber, director of the Conference on Street and Highway Safety reported that the seven technical committees will be ready to submit final drafts of their reports the latter part of September or early in October.

These committees were organized by Secretary Hoover to do the preliminary work of the Conference and their reports are of great importance to the work of the committee on Public Relations for as brought out early in the meeting this committee must know what material it is going to have to deal with before it can undertake to devise machinery for the making of the work of the technical committees most effective in accident prevention.

George M. Graham, vice president of the Chandler Motor Car Company and chairman of the committee, presided.

A considerable portion of the session was given over to a discussion of the various phases of the traffic problem which are now being studied by the other committees.

#### Graham Visualizes Work

Chairman Graham visualized the work of the committee to be the bringing together all the public elements in the communities throughout the United States and show them how the results of the General Conference should be applied. To accomplish this he said he thought the committee might very well undertake to set up ideal procedures for towns and cities of various classes. In other words the scope of the work of the Committee on Public Relations is understood to be a study of the accident prevention program of the organizations which have joined in the movement with a view of coordinating them into a general National Program and to study the results of the work of the other committees with a view of determining the best possible methods of putting these results into effect.

With this in view Chairman Graham appointed two subcommittees the one to study the subject from the standpoint of Federal State and Municipal officials and the other to study it from the standpoint of the co-operating organizations.

#### HANDLE PIERCE-ARROW

SALT LAKE CITY, Utah, Aug. 25.—Western Motors, Inc. have been appointed Pierce-Arrow distributors for Utah, Idaho and Nevada.

## WITH THE ASSOCIATIONS

### What Is a Tire Dealer?

ST. LOUIS, Mo., Aug. 25.—At a meeting of the Associated Tire Dealers of St. Louis recently at the State Tire Co., 2206 Locust street, the question "What Is a Tire Dealer?" was discussed. The reason for the discussion was the complaint of tire dealers that tire manufacturers were allowing gasoline filling stations and repair shops regular dealer discounts, although such places carried no stocks of tires or facilities for repairs.

A letter from the National Tire Dealers' Assn. was read showing the same complaint was prevalent in other quarters and outlining the course of action the national association intended to take. A. P. Woehrle, president of the St. Louis Association, said he would await action by the national body before taking any steps here.

Woehrle, Sam L. Chorlins, vice-president of the association, and Harry F. Schollmeyer, secretary, together with Clarence V. Quinn were authorized to join the national association.

### Sensationalism Decried

WASHINGTON, Aug. 25.—Tactics of certain writers who are playing up automobile accidents in an effort toward sensationalism, using the term "murder" with reference to misuse of automobiles and "slaughter" to describe fatalities on the streets and highways, is described in an announcement recently sent by the American Automobile Association to its million members. The members are asked to refrain from considering the national automobile traffic and accident problem as anything but a personal problem that can be solved only by continued conscientiousness on the part of the car owner.

It is pointed out by the A. A. A. that the attitude of these writers tends to complicate the problem, rather than solve it, by leading the public to believe that the matter is something beyond its control.

"The seriousness in the whole accident problem," declares President Thomas P. Henry of the A. A. A., "is the pseudo-seriousness of many who are talking the loudest about it. The causes of accidents are no mystery to anyone who will take the trouble to investigate them, and to feature this problem as a national mystery is to defeat the purpose of sane safety work."

The A. A. A. reports that all its affiliated clubs throughout the country are working toward awakening the individual motorist to a consciousness of the accident problem as a personal matter. Many other organizations are doing the same thing, it is stated, with results that are reflected in the fact that the death rate per 10,000 automobiles registered today is only about half the 1916 death rate.

### 3 Tradesmen Candidates

DETROIT, Aug. 25.—The Michigan Automotive Trade Association is calling the attention of its members to the candidacy of three automobile dealers for election to the State legislature. The candidates are O. R. Starkweather, Dodge Brothers dealer in Lansing; Leo F. Mullin, Reo dealer in Detroit; Nelson Farrier of Hillman, the latter seeking reelection, and being previously the only representative of the industry in the legislature.

In his bulletin calling attention to the candidates, W. D. Edenburn, general manager of the association, says that the best interests of the automobile business makes it advisable to work for the election of these men.

### Fair Motor Show Doubtful

COLUMBUS, O., Aug. 25.—Because of the fact that managers of the annual Ohio State Fair, which will be held in Columbus from Aug. 31 to Sept. 7, inclusive, have refused to lease the automobile building to the Columbus Auto Dealers' Association as has been the case for 10 years, it is doubtful if there will be much of an automobile show during the fair.

The managers of the fair decided to lease space to individual dealers, and as a consequence many of the agents will refuse to exhibit. The association has gone to considerable expense wiring the building.

### Plan County Association

BALTIMORE, Md., Aug. 25.—Plans are being made by the automobile dealers of Montgomery county, Md., to organize the Montgomery County Automobile Dealers' Association. John E. Raine, secretary of the Baltimore Automobile Trade Association, Inc., and dealers in Baltimore have been asked to help bring about the organization of the new body. The headquarters will be in Rockville, Md., and the territory included will extend from Ridgeville, Md., to Washington, D. C.

### Clash Over Name

SALT LAKE CITY, Utah, Aug. 25.—Following close on a recent adverse decision by the District Court, the Utah State Automobile Association is making one more attempt to prevent the Automobile Club of Utah from using that name. The Association will now try to prove that they have the full and exclusive right to this title as well as the one they are using.

### Name Is Changed

MINNEAPOLIS, Aug. 25.—The Garage Owners Association of Minnesota has changed its name to the Minnesota Motor Trades Association. It will continue its present activities, specializing more than ever on dealers' problems.

## Distributors and Dealers Are Velie Motors Factory Guests

### Sales Agents Presented 1925 Line, Hear Talks and Have Good Time at Moline

MOLINE Ill., Aug. 25.—More than 150 Velie distributors and dealers holding direct sales contracts were the guests of the Velie Motors Corporation here during a two day convention held at the local factory.

The convention was opened by W. L. Velie, president of the Company. F. E. Bradfield, vice-president in charge of sales, then presented the 1925 Velie line to distributors. Following the special exhibition of cars a luncheon was served at the factory.

The afternoon session, of the first day was opened with a talk by E. McEwen, Manager of the Company. Mr. McEwen discussed the progress made by Velie during the last six months and spoke on the need of distribution and dealers organizing their establishments to keep down overhead costs.

He gave examples of many things that could be done to make retail selling much more profitable for the dealer.

William S. Power, President of Power, Alexander & Jenkins, Detroit advertising council of the Company, spoke to the dealers on sales promotion work.

Herbert C. Snow, Chief Engineer of the company, discussed mechanical features giving reasons for many Velie adaptations. Herbert Farrow, Superintendent of the Velie Engine Plant at Marion, Indiana, told what had been done to improve the Velie airplane type engine and Henry Lord, in charge of export sales, spoke on the progress made in the foreign field in the last seven months.

The first day's session was finished with talks by A. F. McCrea, Advertising Manager of the company, on the merchandising plans for the next year and with a final sales talk by Mr. Bradfield.

Distributors and dealers were the guests of the company at a dinner at the LeClaire Hotel. At this time cash prizes were awarded winning distributors in the recent sales contest. A prize of \$1,000 went to the Garland Auto Company, New York, as the winner of the prize offered for volume sales. T. D. Corby, Wheeling W. Va., distributor, was awarded a prize of \$750, the O'Leary Velie Company, of Iowa City was awarded two prizes of \$500 each, and the C. W. Mason Auto Company, Galesburg, Ill., was awarded a check for \$250.

The second day was devoted to business discussions with factory executives.

### NEW FACTORY UNIT

FLINT, Mich., Aug. 25.—Another three-story reinforced concrete unit to the factory of the AC Spark Plug Co. is nearing completion. It is expected the building will be ready for occupancy Sept. 1.



# SQUEEKS & RATTLES

"WILL you kindly tell me how far it is to Squashburg?" inquired the motorist of the pedestrian who was leading an obstinate cow.

"Well," replied the native, "this here detour you're beginnin' now takes you four mile south, one west and four north. Well, you go a quarter west again to the next detour. Well, that detour takes you three north, one west and three south. Well, podner, that's Squashburg, about 17 mile."

"Much obliged for the information."

"That's all right, podner. You're welcome. I'm goin' across the fields to Squashburg now with this here cow. If you need any more directions call on me at the store when you git there."

There are a great many vacationists just now who could offer material for our new book entitled: "OUT IN THE GREAT WIDE OPEN SPACES—AND NOT A GARAGE FOR MILES."

The season's most popular literature: The road map.

## Not Very Definite

Tourist to Farmer: Friend, can you help me out of a little trouble? You see—er—well, the truth of the matter is I have rather lost my bearings.

Farmer: Now, ain't that too bad. Ball or roller?

## And We Let 'Em Live

Over the hills and so far, far away  
You drive all the night and you drive all day;  
You travel, burn gas, and never do stop,  
You steer and shift gears 'till you almost flop;  
And all this because some dern galoot  
Whose anatomy you'd like to boot,  
Pretending to know highway lore the best,  
Said to "turn east" when the chump meant "go west."

Now the National Association of Pickle Manufacturers is talking about taking the warts off of pickles. More efficiency expert's blah, blah, we take it.

## Coming Motor Events

### Automobile Shows

Chicago	Jan. 24-31, 1925
National Automobile Chamber of Commerce.	
Chicago	Oct. 11-18
Second Annual Closed Car Show, Coliseum, under the auspices of the Chicago Automobile Trade Association. L. L. Fest in charge.	
Chicago	Oct. 21-27
First National Transportation Show in American Exposition Building, promoted by Motor Truck Industries, Inc. William Hallanger, Manager.	
Chicago	Jan. 26-31
Twentieth Annual Automobile Salon.	
Dallas, Texas	Oct. 11-26
Annual Automobile Show, Fair Grounds, under the auspices of the Dallas Automotive Trades Association.	
Detroit	Jan. 17-24, 1925
Detroit Automobile Show, Detroit Dealers' Association.	
El Paso, Texas	Sept. 20-27
Automobile Show, Exposition Grounds, under the auspices of the Automobile Department of the International Fair Association. W. J. Wile and E. C. Heid, General Chairmen.	
Green Bay, Wis.	Aug. 25-30
Automotive Division, Association of Commerce. W. F. Kerwin, Manager.	
Indianapolis	Sept. 1-6
Annual Fall Automobile and Accessory Show, in conjunction with Indiana State Fair, Automobile Building, Fair Grounds. William Jones, Manager.	

Kansas City, Mo.	Feb. 7-14, 1925
Kansas City Motor Car Dealers' Association Show.	
Newark, N. J.	Jan. 10-17, 1925
Eighteenth Annual Automobile Show under the auspices of the New Jersey Automobile Exhibition Co., Chamber of Commerce Building. Claude E. Holgate, Manager.	
New York	Nov. 9-15
Twentieth Annual Automobile Salon, Hotel Commodore.	
New York	Jan. 3-10, 1925
National Automobile Chamber of Commerce.	
Sacramento, Cal.	Sept. 1-10
State Agricultural Society. C. E. Paine, Manager.	
Toronto, Ont.	Aug. 23-Sept. 6
Canadian Automotive Equipment Association and the Automotive Industries of Canada. Gib Robertson, Secretary.	

### Foreign Shows

Berlin	Sept. 26-Oct. 5
Paris, France	Oct. 2-12
Passenger Car and Accessory Show.	
London, England	Oct. 16-25

### Conventions

Akron, Ohio	Nov. 18-20
Annual Convention of the National Tire Dealers Association.	
Atlantic City	Oct. 14-17
Thirteenth Annual Convention National Hardware Association of the United States, Marlborough-Blenheim Hotel.	
Chicago	Jan. 26-29, 1925
Eighth Annual Convention, N. A. D. A., Hotel LaSalle.	

Cleveland	Nov. 18-19
Joint Service Meeting of the Society of Automotive Engineers and the National Automobile Chamber of Commerce.	
Detroit	Oct. 22-24
S. A. E. Production Meeting and Exhibition.	
Detroit	January
Annual Meeting of the Society of Automotive Engineers.	
New York City	Jan. 7, 1925
New York Show, Convention N. A. D. A., Hotel Commodore.	
White Sulphur Springs, W. Va.	Sept. 17-20
Annual Meeting of the Automotive Electric Association, Greenbrier Hotel.	
Wilkes-Barre, Pa.	Oct. 17-18
Fourth Annual Convention of the Pennsylvania Automotive Association, Hotel Stirling.	

### Races

Altoona, Pa.	Sept. 1
Altoona Speedway Association—250 miles.	
Colorado Springs, Colo.	Sept. 1
Pike's Peak Highway—12½ miles.	
Fresno, Cal.	Oct. 4
Fresno Speedway Association—150 miles.	
Kansas City, Mo.	Oct. 19
Kansas City Speedway Association—250 miles.	
Los Angeles, Cal.	Nov. 29
Los Angeles Speedway Association—250 miles.	
Milan, Italy	Sept. 7
Monza Track—Italian Grand Prix.	
Readville, Mass.	Sept. 6
Short races—Jack Le Cain, Promoter.	
Syracuse, N. Y.	Sept. 13
Horace F. Murphy—100 miles.	

# Prices and Weights of Current Passenger Car Models

Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	
AMERICAN "D-66"					CHEVROLET					DUESENBERG					HAYNES					
2985	2-p		Roadster	\$1,950											3295	5-p		Touring	\$1,600	
3175	4-p		Sp. Roadster	2,050	1690	2-p		Sup. Roadster	\$495	3200	2-p		Roadster	\$6,500	3590	5-p		Sedan	2,300	
3260	5-p		Touring	1,695	1790	5-p		Sup. Touring	510	3750	7-p		Phaeton	6,750	3560	5-p		Brougham 4 d.	2,200	
3300	5-p		Sport	1,850	1955	5-p		Phaeton DeLuxe	640	3750	4-p		Sp. Phaeton	6,500	HUDSON					
3310	7-p		Touring	1,760	2005	4-p		Sup. Coupe	725	4000	4-p		Coupe	7,500	<b>"Super Six"</b>					
3190	4-p		Sp. Touring	1,885	1880	2-p		Sup. Utility Coupe	640	4350	7-p		Sedan	7,800	3300	4-p		Speedster	\$1,400	
3470	7-p		Sedan	2,550	2070	5-p		Sup. Sedan	795	DU PONT					3425	7-p		Phaeton	1,500	
3310	5-p		Brougham	2,195	CHANDLER SS					<b>"C"</b>					3450	5-p		Coach	1,500	
ANDERSON "41"					2945	2-p		Roadster	\$1,795	3300	2-p		Roadster	\$2,090	3675	7-p		Sedan	2,250	
2650	5-p		Touring	\$1,195	3130	4-p		Roadster	1,785	3400	5-p		Touring	2,090	HUPMOBILE					
2675	4-p		Sp. Touring	1,445	3160	5-p		Touring	1,685	3600	5-p		Touring Sedan	3,050	<b>"R"</b>					
2925	2-p		Coupe	1,425	3218	7-p		Touring	1,735	3600	5-p		Suburban Sedan	3,050	2595	2-p		Roadster	\$1,200	
2725	4-p		Coach	1,495	3250	4-p		Royal Dispatch	1,885	2235	2-p		Roadster	\$1,040	2705	5-p		Touring	1,200	
2875	5-p		Sedan	1,695	3380	5-p		Chummy Sedan	1,845	2325	5-p		Touring	890	2760	2-p		Coupe	1,440	
2925	5-p		Sp. Sedan	1,895	3600	5-p		Sedan	1,995	2345	5-p		Touring F.W.B.	940	2860	4-p		Coupe	1,595	
			Brougham 3 d.	1,595	3480	7-p		Limousine	3,095	2395	5-p		Sp. Touring	1,090	2975	5-p		Sedan	1,775	
2975	7-p		Touring	1,595	CHRYSLER					2495	5-p		Coupe	1,340	2875	5-p		Club Sedan	1,450	
3200	7-p		Sedan	1,945	2620	4-p		Roadster	\$1,625	2405	2-p		Business Coupe	1,035	JEWETT					
APPERSON "6"					2570	5-p		Touring	1,395	2605	5-p		Sedan	1,365	2690	5-p		Touring	1,135	
2915	5-p		Phaeton	\$1,395	2600	5-p		Phaeton	1,495	2770	5-p		Touring Sedan	1,465	2810	5-p		DeLuxe Touring	1,290	
2965	5-p		Sp. Phaeton	1,600	2800	5-p		Sedan	1,725	2550	5-p		Coach	1,185		3-p		Bus. Coupe	1,310	
3400	5-p		Sedan	1,995	2915	5-p		Imperial Sedan	1,995	ELCAR					2880	5-p		Sedan	1,545	
3450	5-p		Sp. Sedan	2,195	2855	5-p		Brougham	1,895	<b>"4-40-41"</b>					3095	5-p		DeLuxe Sedan	1,745	
4100	5-p		Phaeton	\$2,485	CLEVELAND "43"					2560	5-p		Touring	\$995	2775	5-p		Brougham	1,385	
4315	7-p		Phaeton	2,535	2750	5-p		Touring	1,095	2585	5-p		Demi Sp. Touring	1,095	.....	5-p		Sp. Brougham	1,725	
4250	5-p		Sport Phaeton	2,900	2810	5-p		Touring De Luxe	1,195	2641	5-p		Sportster	1,195	JORDAN					
4440	5-p		Sedan	3,485	2830	3-p		Coupe	1,295	2900	5-p		Sedan	1,495	<b>(120 in. W. B.)</b>					
4570	5-p		Sport Sedan	3,750	2840	3-p		Spec. Coupe	1,395	2981	5-p		Sp. Sedan	1,695	3000	2-p		Playboy Road.	\$1,850	
4555	7-p		Sedan	3,585	2930	5-p		Sedan 2-door	1,395	2779	5-p		Brougham 3 d.	1,265	3100	5-p		Touring	1,775	
AUBURN "6-43"					3040	5-p		Spec. Sedan 4 d.	1,495	2829	5-p		Sp. Brough. 3 d.	1,395	3420	5-p		Brougham 4 d.	2,385	
2550	5-p		Touring	\$1,095	COLE MASTER					<b>"6-50-51"</b>					3375	4-p		Victoria	2,385	
2672	5-p		Special Touring	1,395	3695	4-p		Volante Touring	\$2,325	2600	5-p		Demi Sp. Tour.	\$1,220	<b>(124 1/2 in. W. B.)</b>					
2772	5-p		Sp. Touring	1,465	3765	7-p		West. Tour	2,325	2690	5-p		Sp. Touring	1,420	3260	4-p		Blueboy Touring	2,095	
2850	5-p		Coupe Touring	1,695	3695	4-p		Aero-Vol. Tour.	2,475	2900	5-p		Sedan	1,720	3585	5-p		Sedan	2,585	
2852	5-p		English Coach	1,945	3950	5-p		Brouette Sedan	3,225	2981	5-p		Sp. Sedan	1,920	Series "A"					
2932	5-p		Sedan	1,795	4090	7-p		Royal Sedan	3,225	2779	5-p		Brougham	1,490	8000	2-p		Playboy Road.	2,575	
<b>"6-63"</b>					4150	7-p		Royal Limousine	3,325	2829	5-p		Sp. Brougham	1,620	3100	5-p		Touring	2,575	
3262	5-p		Touring	1,795	COLUMBIA					<b>"6-61"</b>					3420	5-p		Brougham	2,875	
3332	5-p		Sp. Touring	2,035	2480	5-p		Roadster	1,775	3380	5-p		Sedan	2,245	3375	4-p		Victoria	2,775	
3562	5-p		Sedan	2,545	2485	5-p		Spec. Touring	1,275	3675	5-p		Sp. Sedan	2,395	3585	5-p		Sedan	2,975	
3572	5-p		Brougham	2,345	2510	2-p		Coupe	1,375	3380	4-p		Brougham	1,995	KING					
.....	7-p		Sedan	2,545	2810	5-p		Sedan	1,775	<b>"8-80"</b>					3428	2-p		Sportster	\$1,895	
BARLEY "6" 6-50					CUNNINGHAM					<b>"V-4"</b>					3428	4-p		Foursome	1,595	
2750	5-p		Touring	\$1,395	4600	7-p		Touring	\$6,300	2130	5-p		Touring	\$900	3528	5-p		Touring	1,595	
2800	5-p		Sp. Touring	1,495	4500	4-p		Sp. Touring	5,800	2305	5-p		Coach	1,000	3645	3-p		Coupe	2,200	
3100	5-p		Sedan	1,850	4700	4-p		Coupe	7,150	FLINT					3875	5-p		Sedan	2,400	
3150	5-p		Sp. Sedan	2,250	5000	6-p		Sedan	7,650	3000	3-p		Sp. Roadster	\$1,630	3875	7-p		Road King Sedan	1,795	
BUICK					<b>"V-4"</b>					<b>"6-70"</b>					3400	5-p		Sedanette	2,295	
2750	2-p		Roadster	\$1,150	3800	4-p		Sp. Touring	\$3,500	<b>"40"</b>					.....	5-p		Touring	1,075	
2800	2-p		Roadster Encl.	1,190	4200	4-p		Sedan	4,500	<b>5-p Touring</b>					FORD					
2920	5-p		Phaeton	1,175	DAGMAR					<b>"24-38"</b>					Without Starter and Dem. Rims					
2970	5-p		Phaeton Encl.	1,250	3800	4-p		Sp. Touring	\$3,500	4150	4-p		Touring	\$6,800	1395	2-p		Runabout	\$265	
.....	2-p		Business Coupe	1,375	4200	4-p		Sedan	4,500	4765	7-p		Touring	6,900	1517	5-p		Touring	295	
3075	4-p		Coupe	1,565	DANIELS					<b>"90"</b>					With Starter and Dem. Rims					
3185	5-p		Dbl. Service Sedan	1,475	4150	4-p		Touring	\$6,800	4600	4-p		Sedan	7,600	1540	2-p		Runabout	\$350	
3245	5-p		Regular Sedan	1,665	4765	7-p		Touring	6,900	5200	7-p		Sedan	7,800	1662	5-p		Touring	380	
<b>"Master"</b>					4600	7-p		Touring	\$6,300	.....	4-p		Sp. Touring	1,795	1772	2-p		Coupe	525	
<b>(120 in. W. B.)</b>					4200	4-p		Sedan	4,500	3000	3-p		Sp. Roadster	\$1,630	1950	5-p		Sedan, Fordor	685	
3300	2-p		Roadster	\$1,365	DAVIS					<b>"91"</b>					1898	5-p		Sedan, Tudor	590	
3455	5-p		Phaeton	1,395	2650	3-p		M. O'War Road.	\$1,495	2580	5-p		Touring	\$1,950	FRANKLIN					
3675	4-p		Coupe	2,125	2915	4-p		Legionnaire Tour.	1,495	2710	4-p		Coupe	2,750	<b>"10 C"</b>					
3845	5-p		Sedan	2,225	2750	5-p		Phaeton	1,395	2730	5-p		Sedan	2,850	2580					
<b>(128 in. W. B.)</b>					3070	5-p		Sedan	1,895	2655	5-p		Demi-Sedan	2,250	2710					
3470	3-p		Sp. Roadster	\$1,750	3065	5-p		Berline Sedan	1,995	2765	5-p		Brougham	2,850	2730					
3605	5-p		Sp. Phaeton	1,800	2700	5-p		Brougham	1,595	<b>5-p Touring Lim.</b>					2,950	2655				
3645	7-p		Phaeton	1,625	DODGE BROTHERS					<b>"Series 5"</b>					2765					
.....	7-p		Phaeton Encl.	1,700	2494	2-p		Roadster	\$865	2520	2-p		Roadster	\$945	2580					
.....	3-p		Country Club	2,075	2653	2-p		Spec. Roadster	1,025	.....	2-p		Sp. Roadster	1,045	2710					
3940	5-p		Brougham Sedan	2,350	2591	5-p		Touring	895	2550	2-p		Radio Roadster	1,135	2730					
4020	7-p		Sedan	2,425	2755	5-p		Spec. Touring	1,055	2555	5-p		Touring	995	2655					
.....	7-p		Sedan Limousine	2,525	2793	4-p		Coupe	1,375	.....	5-p		Sp. Touring	1,095	2765					
.....	7-p		Town Car	2,925	2755	2-p		Coupe B	1,035	2650	5-p		Tour. DeLuxe	1,145	2770					
CADILLAC	<b>"V-63"</b>				2929	4-p		Spec. Coupe	1,535	2895	5-p		Sedan	1,475	2730					
4190	4-p		Roadster	\$3,085	3050	5-p		Sedan B	1,250	3070	5-p		Sp. Sedan	1,595	2655					
4280	7-p		Touring	3,085	3098	5-p		Sedan A	1,385	2680	5-p		Coupe	1,275	2765					
4200	4-p		Phaeton	3,085	3190	5-p		Spec. Sedan	1,545	GARDNER					2765					
4270	2-p		Coupe	3,875	DODGE BROTHERS					<b>"6-80"</b>					2520					
4370	5-p		Sp. Coupe	3,950	4120	4-p		Pasadena Tour.	\$4,150	4115	7-p		Touring	3,950	2550					
4600	5-p		Sedan	4,400	4198	4-p		Coupe	4,985	4200	5-p		Sedan	5,550	2555					
4610	7-p		Sedan	3,585	4310	7-p		Sedan	5,800	DORRIS					3750					
4480	5-p		DeLuxe Sedan	4,150	DODGE BROTHERS					<b>"27"</b>					3950					
4530	5-p		Town Brougham	4,600	2595	5-p		Touring	\$1,095	2780	5-p		Sp. Touring	1,245	4010					
4640	7-p		Limousine	4,600	2653	2-p		Spec. Roadster	1,025	3010	5-p		Bres. Coupe	1,385	HATFIELD					
4640	7-p		Suburban	4,500	2755	5-p		Spec. Touring	1,055	3030	5-p		Coupe	1,535	3080					
4560	7-p		DeLuxe Suburban	4,250	2793	4-p		Coupe	1,375	3045	5-p		Sedan	1,595	3225					
4380	4-p		Victoria	3,275	2755	2-p		Coupe B	1,035	3080	5-p		Brougham	1,535	3300					
4475	5-p		Landau	3,650	2929	4-p		Spec. Coupe	1,535	DORRIS					3750					
CASE					3050	5-p		Sedan B	1,250	<b>"6-80"</b>					3950					
3020	3-p		Roadster	\$1,840	3098	5-p		Sedan A	1,385	<b>"27"</b>					4010					
3050	5-p		Touring	1,885	3190	5-p		Spec. Sedan	1,545	<b>"6-80"</b>					3080					
3200	5-p		Sp. Phaeton	2,230	DODGE BROTHERS					<b>"6-80"</b>										



## Prices and Weights of Current Passenger Car Models

Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price
LOCOMOBILE					OLDSMOBILE					REVERE					STUTZ				

# Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

MAKE AND MODEL	Wheelbase (Ins.)	TIRES		ENGINE										Electrical System		Clutch	Gear-set	Universal Joints	REAR AXLE		BRAKES				Steering Gear	Rear Springs
		Standard Size (Ins.)	Balloon Equipment	Make	Model	Number of Cylinders, Bore and Stroke (Ins.)	Rated Horsepower, N.A.C.C.	Valve Arrangement	Piston Material	Number of Main Crankshaft Bearings	Oiling System	Carburetor Make	Ignition System Make	Generator and Starter Make	Type and Make				Make	Type and Make	Type and Make	Gear Ratio	Foot, Type and Location	Hand, Type and Location		
American.....D-66	127	33x4 1/2	No	H-Sp	91	6-3 1/2 x 5	29.40	L	C	3	PS	Str	A-K	G-D	P-B&B	War	M-Har	F-Sal	5.10	E-R	I-R	None	Lav	S-57 1/2		
Anderson.....41	115	32x4	Yes*	Cont	7U	6-3 1/2 x 4 1/4	23.44	L	C	4	PC	Zen	Wes	Wes	P-B&B	Dur	F-Thi	1/2 Sal	4.75	E-R	E-T	Mec*	Gem	S-58		
Anderson.....59	122	32x4	Yes*	Cont	8R	6-3 1/2 x 4 1/4	27.34	L	C	4	PC	Zen	Rem	Rem	P-B&B	Dur	F-Uhi	3/4 Sal	4.62	E-R	E-T	Mec*	Gem	S-58		
Apperson.....6	120	32x4	Yes*	Fall	T8000	6-3 1/2 x 4 1/4	23.44	L	C	3	PS	Str	Rem	Rem	P-Roc	Mec	M-Thi	1/2 Col	5.10	E-R	I-R	Mec*	Lav	J-48		
Apperson.....8	130	33x5	No	Own	8	8-3 1/2 x 5	33.80	L	C	3	PS	Joh	Rem	Bij	D-Own	Own	M-Thi	1/2 Own	4.25	E-R	I-R	Mec*	Own	J-48		
Auburn.....6-43	114	31x4	Yes*	Cont	7U	6-3 1/2 x 4 1/4	23.44	L	C	3	PC	Str	Rem	Rem	P-B&B	War	M-Uni	1/2 Col	4.63	E-R	E-T	Mec*	Jac	S-57		
Auburn.....6-63	122	32x4 1/2	Yes*	Weid	Spec	6-3 1/2 x 5	25.35	L	C	3	PC	Str	Rem	Rem	P-B&B	War	M-Thi	1/2 Col	4.63	E-R	E-T	Mec*	Ros	S-57		
Barley.....6-50	118	32x4	No	Cont	7U	6-3 1/2 x 4 1/4	23.44	L	C	4	PC	Str	Del	De	P-B&B	Ful	R-M&E	1/2 Col	5.11	E-R	I-R	None	Jac	S-56		
Buick....."Standard"	114 3/4	31x4 1/2	Yes	Own	Sta	6-3 1/2 x 4 1/4	21.60	L	C	4	PS	Mar	Del	De	D-Own	Own	M-Own	1/2 Own	4.66	E-F	I-R	Mec	Jac	S-55 1/2		
Buick....."Master"	120	32x5 7/8	No	Own	6	6-3 1/2 x 4 1/4	27.34	L	C	4	PC	Mar	Del	De	D-Own	Own	M-Own	1/2 Own	4.10	E-F	I-R	Mec	Jac	V-46 1/2		
	128																	4.70								
Cadillac.....V-63	132	33x5	Yes*	Own	63	8-3 1/2 x 5 1/4	31.25	L	C	3	PC	Own	De	De	D-Own	Own	M-Spi	F-Own	4.50	E-F	I-R	Mec	Own	N-54		
Case.....JIC	122	32x4 1/2	Yes	Cont	8R	6-3 1/2 x 4 1/4	27.34	L	C	4	PC	Sch	Del	Del	D-Own	Own	R-Sue	1/2 Col	4.90	E-R	I-R	Hyd*	Jac	S-54 1/2		
Case.....Y	132	33x5	No	Cont	6T	6-3 1/2 x 5	33.75	L	C	4	PC	Ray	Del	Del	D-Own	Own	R-Sue	1/2 Col	4.40	E-R	I-R	None	Jac	S-57		
Chalmers.....Y	117	32x4	No	Own	6	6-3 1/2 x 4 1/4	25.35	L	A	3	PS	Str	A-L	A-L	P-Mec	War	M-Mec	1/2 Tim	5.13	E-R	I-R	Hyd*	Gem	S-56		
Chalmers.....Y	122	33x4 1/2	No	Own	6	6-3 1/2 x 4 1/4	25.35	L	A	3	PS	Str	A-L	A-L	P-Mec	War	M-Mec	1/2 Tim	5.13	E-R	I-R	Hyd*	Gem	S-56		
Chandler.....SS	123	31x6 1/2	Yes	Own	6	6-3 1/2 x 5	29.40	L	C	4	PC	Sch	Bos	Bos	P-B&B	Own	M-The	F-Own	4.45	E-R	E-T	Mec*	Own	S-58 1/2		
Chevrolet.....Superior	103	30x3 1/2	No	Own		4-3 1/2 x 4	21.76	L	C	3	PS	{Zen Hol	Rem	Rem	K-Own	Own	M-Own	1/2 Own	3.77	E-R	I-R	None	Own	Q-28		
Chrysler.....Six	112 3/4	30x5 7/8	Yes	Own		6-3 1/2 x 4 1/4	21.60	L	A	7	FP	PC	Rem	Rem	D-Own	Own	M-Own	1/2 Own	4.60	E-F	E-T	Hyd	Jax	S-51 1/2		
Cleveland.....43	115	31x5 1/2	Yes	Own	43	6-3 1/2 x 4 1/4	23.44	L	C	3	PC	Sch	Del	Del	P-B&B	Own	R-Sue	1/2 Own	4.90	E-R	E-T	Mec*	CAS	S-53		
Cole.....Master	127 1/2	20x7 3/8	Yes*	Nort	311	8-3 1/2 x 5 1/4	39.20	L	A	3	PC	Sch	Del	Del	D-Nor	Nor	M-Spi	F-Col	4.70	E-R	I-R	None	Gem	S-57		
Columbia.....	115	31x4	Yes*	Cont	7U	6-3 1/2 x 4 1/4	23.44	L	C	4	PC	Str	A-L	A-L	P-B&B	Dur	M-Spi	1/2 Tim	4.80	E-R	E-T	Hyd*	Gem	S-56		
Crawford.....6-70	138	33x4 1/2	No	Cont	6T	6-3 1/2 x 4 1/4	31.54	L	C	4	PC	Zen	Wes	Bos	D-B-L	B-L	M-Spi	1/2 Tim	5.00	E-R	I-R	None	Lav	S-56		
Cunningham.....V4	142	33x5	No	Own	V4	8-3 1/2 x 5	45.00	L	C	3	FP	Str	Del	Del	D-Own	Own	R-Sue	F-Tim	4.23	E-R	I-R	None	Gem	J-62		
Dagmar.....6-70	138	33x5	No	Cont	6T	6-3 1/2 x 5 1/4	31.54	L	C	4	PC	Zen	Wes	Bos	D-B-L	B-L	M-Spi	1/2 Tim	5.00	E-R	I-R	None	Lav	S-56		
Daniels.....24-38	138	33x5	Yes*	Own	24-38	8-3 1/2 x 5 1/4	39.20	L	C	3	PC	Zen	Del	Del	P-Own	Own	M-Spi	F-Tim	4.23	E-R	I-R	None	Gem	S-56		
Davis.....90	115	31x4	Yes*	Cont	7U	6-3 1/2 x 4 1/4	23.44	L	C	4	PC	Str	Del	Del	P-B&B	W-G	M-Pet	1/2 Tim	5.10	E-R	I-R	Hyd	Ros	S-52		
Davis.....91	118	32x4 1/2	Yes*	Cont	8R	6-3 1/2 x 4 1/4	27.34	L	C	4	PC	Str	Del	Del	P-B&B	W-G	M-Pet	1/2 Tim	5.10	E-R	I-R	Hyd	Ros	S-52		
Dodge Brothers.....	116	32x4	Yes*	Own	4-3 1/2 x 4	24.03	L	A	C	3	PS	Str	N-E	N-E	D-Own	Own	M-Own	1/2 Own	4.54	E-R	I-R	None	Own	S-55		
Dort.....27	115	31x4	Yes*	Fall	T8000	6-3 1/2 x 4 1/4	23.41	L	C	3	PC	Car	Bos	Bos	D-Dtl	Own	M-The	3/4 Fli	4.66	E-R	I-R	None	Gem	V-50		
Duesenberg Straight.....	134	33x5	No	Own	8	8-2 1/2 x 5	26.45	L	A	3	PC	Str	Del	Del	P-Own	Own	R-Chi	1/2 Own	4.90	I-F	E-T	Hyd	Lav	S-59		
Dupont.....C	124	32x4 1/2	No	H-Sp	90	6-3 1/2 x 5	29.40	L	C	3	PS	Str	Wes	Wes	D-B-L	B-L	M-Spi	F-Col	4.45	E-R	I-R	None	Jac	S-58		
Durant.....A-22	109	31x4	Yes*	Cont	Spec	4-3 1/2 x 4 1/4	24.03	L	A	3	PC	Til	A-L	A-L	P-Own	War	M-Spi	3/4 Ad	4.33	E-R	I-R	Mec*	War	S-50 1/2		
Elcar.....6-41	112	31x4	Yes*	Lyc	CF	4-3 1/2 x 5	21.03	L	A	5	PC	Zen	Del	A-L	P-B&B	W-G	M-Mec	1/2 Sal	4.70	E-R	I-R	Mec*	Ros	S-51		
Elcar.....6-51	113	31x4	No	Cont	7U	6-3 1/2 x 4 1/4	23.44	L	C	4	PC	Str	A-L	A-L	P-B&B	W-G	M-Mec	1/2 Sal	4.70	E-R	E-T	Mec*	Ros	E-51		
Elcar.....6-61	118	32x4	Yes*	Cont	8R	6-3 1/2 x 4 1/4	27.34	L	C	4	PC	Str	Del	Del	P-B&B	W-G	M-Har	3/4 Sal	4.70	E-R	I-R	Mec*	Ros	S-52		
Elcar.....8-80	127	32x6 1/2	Yes	Lyc	8	8-3 1/2 x 4 1/4	31.25	L	C	5	PS	Ste	Bos	Bos	D-Own	Own	M-Spi	1/2 Own	5.60	E-F	I-R	Hyd	Ros	S-58		
Essex.....6	110 1/2	31x5 1/2	Yes	Own	6	6-2 1/2 x 4 1/4	17.32	L	A	3	Sp	Ste	Bos	Bos	D-Own	Own	M-Spi	1/2 Own	5.60	E-R	I-R	None	Own	S-54 1/2		
Flint.....40	115	30x5 1/2	Yes	Own	40	6-3 1/2 x 4 1/4	23.44	L	C	4	PC	Til	A-L	A-L	P-Own	War	M-Spi	1/2 Ad	4.77	E-F	E-F	Mec*	War	S-50		
Flint.....55	120	32x4 1/2	Yes*	Cont	Spec	6-3 1/2 x 5	27.34	L	C	7	PC	Str	DeJ	DeJ	P-Own	War	M-Spi	1/2 Ad	4.77	E-R	I-R	Mec*	War	S-54		
Ford.....T	100	30x3 1/2	No	Own	T	4-3 1/2 x 4	22.50	L	C	3	Sp	{Own Hol	Own	Own	D-Own	Own	M-Own	1/2 Own	3.63	E-T	I-R	None	Own	O-43 1/2		
Franklin.....10 C	115	32x4 9/16	Yes*	Own	10-C	6-3 1/2 x 4	25.35	L	A	7	PC	Str	A-K	A-K	P-M&E	Own	M-Spi	1/2 Own	4.73	E-T	E-R	None	Own	E-38		
Gardner.....Series 5	112	32x4	Yes*	Lyc	CE	4-3 1/2 x 5	21.76	L	A	5	PC	Zen	Wes	Wes	P-B&B	Mec	M-Pet	3/4 Fli	4.80	I-R	I-R	None	Ros	S-51		
Gray.....0	104	30x3 1/2	Yes*	Own	R	4-3 1/2 x 4	21.03	L	C	3	Sp	Sco	Wes	Wes	P-Own	Det	R-Sue	1/2 Tim	3.90	I-R	I-R	None	Own	Q-30		
H.C.S.....Series 4	120	32x4 1/2	No	Weid	Spec	4-3 1/2 x 5 1/2	22.50	L	C	3	PS	Str	Del	Del	D-B-L	B-L	M-Spi	1/2 Own	4.63	I-R	I-R	None	Gem	S-56		
H.C.S.....Series 6	126	32x5	Yes*	Own	6	6-3 1/2 x 5	29.40	L	C	3	FP	Str	Del	Del	D-B-L	B-L	M-Spi	3/4 Own	4.63	I-R	I-R	None	Gem	S-56		
Hatfield.....6-55	121	32x4	No	H-Sp	40	6-3 1/2 x 5	25.35	L	C	3	PS	Str	Bos	Bos	P-B&B	Dur	M-Spi	1/2 Col	4.63	E-R	I-R	None	Gem	S-58		
Haynes.....60	121	33x5 7/8	Yes	Own	60	6-3 1/2 x 4 1/4	29.40	L	C	3	PS	Ray	Kin	L-N	D-Own	Mec	M-Thi	1/2 Own	4.41	E-R	E-T	None	Jac	S-54 1/2		
Hudson.....Super 6	127	33x6 1/2	Yes	Own	6	6-3 1/2 x 5	29.40	L	A	4	Sp	Ste	Bos	Bos	D-Own	Own	M-Spi	F-Tim	4.45	E-R	I-R	None	Gem	S-58		
Hupmobile.....Series R	115	32x4	Yes*	Own	R	4-3 1/2 x 5 1/2	16.90	L	A	3	PC	Str	Wes	Wes	D-Lon	Own	R-Uni	3/4 Own	4.87	E-R	I-R	None	Ros	S-56 1/2		
Jewett																										



**THE SATURDAY EVENING POST**

*She leads her car a merry chase!*

IN winter, it stands long hours in the sleet and snow. In spring, the jewel-like drops of passing showers reflect the sun's bright rays and become burning-planes to mar its surface. In summer and fall, the dust and grit of far-flung roads lie thick upon it. And yet her motor must greet each new day as sleek, as rich in color, as on the day it first became a member of the household.

And that's why DUOCO—discovered by du Pont Chemical Engineers—marks the beginning of a new era in motor car finishing. It's rich, satin luster appeals to people who appreciate quiet elegance in their motor cars as well as in their homes.

Your car deserves DUOCO.

E. I. DU PONT DE NEMOURS & CO., INC.  
Chemical Products Division  
PARLIN, N. J.

**DUOCO**

**Refinishing**

See how, when, where you can get your car refinished with a special Duco finish. The Duco Refinishing Stations are everywhere. They are the only places where you can get your car refinished with a special Duco finish. They are the only places where you can get your car refinished with a special Duco finish.

**Other Uses**

See how, when, where you can get your car refinished with a special Duco finish. The Duco Refinishing Stations are everywhere. They are the only places where you can get your car refinished with a special Duco finish. They are the only places where you can get your car refinished with a special Duco finish.

*A story that millions are reading—  
a finish that thousands will want!*

Duco is Factory Standard on: Oakland (all models); Buick (all Sport Models); Cadillac (Roadster); Chevrolet (Touring de Luxe); Gardner (Special Touring Models); Marmon (Sport Speedsters); Moon (Roadster Series "A"); Hupmobile (Roadster, Touring, 2-passenger Coupé, Club Sedan.)

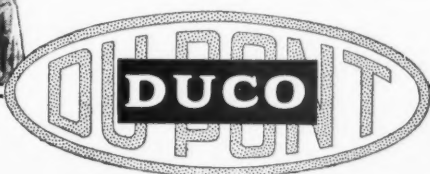
Over 200 Duco Refinishing Stations have already been established throughout the country. Training schools are being organized as rapidly as possible.

THE above miniature advertisement is reproduced from the beautiful color page advertisement for Duco, which appears August 16, in The Saturday Evening Post. Millions of men and women will read this advertisement—many thousands of car owners will want Duco, du Pont's new automobile finish.

People right in your own town are reading the unusual story of Duco's beauty—its deep, softly lustrous color tones; and of Duco's durability—its resistance to rain, sun, engine heat, scratches, mud and wear. Many of these prideful car-owners will expect that you can refinish their cars in Duco—they will look to you!

Equip yourself to handle the profitable Duco Refinishing business in your territory. Write for full information.

E. I. DU PONT DE NEMOURS & CO., Inc.  
Chemical Products Division: Parlin, N. J.



## Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

MAKE AND MODEL	Wheelbase (Ins.)	TIRES		ENGINE										Electrical System		Clutch	Gear-set	Universal Joints	REAR AXLE		BRAKES			Steering Gear	Rear Springs
		Standard Size (Ins.)	Balloon Equipment	Make	Model	Number of Cylinders, Bore and Stroke (Ins.)	Rated Horsepower, N.A.C.C.	Valve Arrangement	Piston Material	Number of Main Crankshaft Bearings	Oiling System	Carburetor Make	Ignition System Make	Generator and Starter Make	Type and Make	Make	Type and Make	Type and Make	Gear Ratio	Foot, Type and Location	Hand, Type and Location	Four Wheel Brake Type	Make	Type and Length	
Paige.....	131	33x4 1/2	Yes*	Cont	Spec	6-3 1/2 x 5	33.75	L	C	4	PC	Ray	A-K	Rem	D-Lon	W-G	M-Mec	1 1/2 Tim	4.90	E-R	I-R	None	Gem	S-61 1/2	
Peerless.....70	126	33x6.2	Yes	Own	70	6-3 1/2 x 5	29.40	L	C	7	PC	Joh	Del	Del	D-Own	Own	M-Spi	1 1/2 Tim	4.66	E-F	I-R	Hyd	Gem	S-54	
Peerless.....66	128	33x5	Yes*	Own	66	8-3 1/4 x 5	33.80	L	C	3	PC	Bal	Del	Del	D-Own	Own	M-Spi	3/4 Tim	4.90	E-R	I-R	Hyd*	Gem	S-60	
Pierce-Arrow.....	133	33x5	No	Own	33	6-4 x 5 1/2	38.40	T	C	7	FP	Wal	Del	Del	D-Own	Own	M-Spi	1 1/2 Own	4.29	E-R	I-R	Mec*	Gem	S-50	
Pierce-Arrow....."80"	130	32x5 7/8	Yes*	Own	"80"	6-3 1/2 x 5	29.40	L	C	7	PC	Own	Del	Del	P-B&B	B-L	M-Spi	1 1/2 Tim	4.45	I-F	I-R	Mec	Gem	S-56 1/2	
Premier.....6-D	126 3/4	32x4 1/2	Yes*	Own	6-D	6-3 1/2 x 5 1/2	27.34	I	A	3	PC	Str	Del	Del	P-B&B	Own	M-Blo	3/4 Col	4.70	E-R	I-R	Mec*	Gem	S-57 1/2	
R&V Knight.....11	124	32x4 1/2	No	Own	Kni	6-3 1/2 x 5 1/2	29.40	X	C	4	PC	Sch	A-L	A-L	P-B-L	B-L	M-Spi	1 1/2 Tim	5.40	E-R	I-R	None	Jac	S-61	
Reo.....T6	120	32x6	Yes	Own	T6	6-3 1/2 x 5	24.34	G	A	4	PS	Sch	NE	NE	D-Own	Own	M-Spi	1 1/2 Own	4.70	E-R	I-R	None	Own	S-54 1/2	
Revere.....M	131	32x4 1/2	Yes*	Mons	4	4-4 1/2 x 6	30.63	II	A	2	PS	Str	Bos	Bos	D-B-L	B-L	M-Spi	3/4 Stn	3.44	E-F	I-R	None	Gem	S-58	
Rickenbacker.....C	117	32x4	Yes*	Own	C	6-3 1/2 x 4 1/2	23.44	L	C	3	PC	Str	Bos	Wes	D-Own	W-G	M-Mec	1 1/2 Own	4.63	I-F	E-T	Mec	Gem	S-57	
Rickenbacker.....A	121 1/2	33x4 1/2	Yes*	Own	A	8-3 x 4 1/2	28.60	L	C	9	PC	Zen	Bos	Del	M-Own	W-G	M-Mec	1 1/2 Tim	5.10	I-F	E-T	Mec	Gem	S-59	
Roamer.....6-54-E	118	32x4 1/2	No	Cont	12XD	6-3 1/2 x 5 1/2	29.40	L	A	3	PS	Spl	Bos	Wes	P-B&B	Ful	R-M&E	3/4 Tim	4.60	E-R	I-R	Mec*	Jac	V-53 1/2	
Roamer.....4-75-E	125	32x4 1/2	No	Dues	G1	4-4 1/2 x 6	28.90	H	A	3	FP	Str	Bos	Wes	D-B-L	B-L	R-M&E	3/4 Tim	4.63	E-R	I-R	Mec*	Jac	V-55 1/2	
Rollin.....G	112	21x5 1/4	Yes	Own	G	4-3 1/2 x 4 1/2	16.90	L	A	4	PC	Til	Con	Dyn	P-B&B	Mun	R-Sne	1 1/2 Sal	5.10	E-F	E-F	Mec	Dit	0-40 1/2	
Rolls-Royce.....40-50	143 1/2	33x5	No	Own	40	6-4 1/2 x 4 1/2	48.60	L	A	7	FP	Own	Bos	Bos	K-Own	Own	M-Own	1 1/2 Tim	3.72	I-R	I-R	None	Own	V-54 1/2	
Stanley.....750	130	33x5 7/8	Yes	Own	750	2-4 x 5	13.00	X	C	2	Non	Non	Bij	Non	P-Own	War	M-Spi	3/4 Ad	4.87	E-R	I-R	None	War	S-49 1/2	
Star.....4	102	30x4.9	Yes	Cont	Spec	4-3 1/2 x 4 1/2	15.63	L	C	3	PS	Til	A-L	A-L	P-Own	Own	M-Spi	1 1/2 Own	4.50	E-R	I-R	Hyd*	Own	V-50	
Stearns-Knight.....SKL	119	33x4 1/2	No	Own	Kni	4-3 1/2 x 5 1/2	22.50	X	C	4	PC	Sch	A-K	A-L	D-Own	Own	R-Cl	1 1/2 Tim	4.70	E-R	I-R	Hyd*	Own	V-50	
Stearns-Knight.....6	130	33x5	No	Own	Kni	6-3 1/2 x 5	25.35	X	C	4	PC	Sch	A-K	A-L	D-Own	Own	R-Cl	1 1/2 Tim	4.70	E-R	I-R	Hyd*	Own	V-50	
Sterling-Knight.....	125	32x4 1/2	Yes*	Own	Kni	6-3 1/2 x 4 1/2	25.35	X	C	7	FP	Str	Wes	Bos	D-Ful	B-L	R-Cl	1 1/2 Tim	4.66	E-R	I-R	Mec*	Ros	S-58	
Stevens Duryea.....G	138	33x5	No	Own	G	6-4 1/2 x 5 1/2	47.25	L	C	4	PC	Str	Bos	Bos	D-B-L	B-L	M-Spi	1 1/2 Tim	3.76	E-R	I-R	None	Ros	S-57 1/2	
Studebaker.....Light Six	112	31x4	Yes*	Own	EM	6-3 1/2 x 4 1/2	23.44	L	C	4	PS	Str	Wag	Wag	P-Own	Own	R-The	1 1/2 Tim	5.00	E-R	I-R	None	Own	S-50	
Studebaker.....Spec. Six	119	32x4	Yes*	Own	EL	6-3 1/2 x 5	29.40	L	C	4	PS	Str	Wag	Wag	P-Own	Own	M-Spi	1 1/2 Tim	4.33	E-R	I-R	None	Own	S-56	
Studebaker.....Big Six	126	33x4 1/2	Yes*	Own	EK	6-3 1/2 x 5	36.04	L	C	4	PS	Bal	Wag	Wag	P-Own	Own	M-Spi	1 1/2 Tim	3.71	E-R	I-R	None	Own	S-56	
Stutz.....690-2	120	32x4	Yes*	Own	691	6-3 1/2 x 5	29.40	I	C	3	PC	Str	Rem	Rem	P-B&B	W-G	M-Mec	1 1/2 Tim	5.10	E-R	I-R	None	Gem	61 1/2	
Stutz.....KLDH	130	32x4 1/2	No	Own	KLDH	4-4 1/2 x 6	30.63	T	C	3	PC	Str	Del	Rem	D-W-G	Own	M-Har	1 1/2 Tim	3.75	I-R	I-R	None	Gem	S-60	
Stutz.....695	130	32x4 1/2	Yes*	Own	691	6-3 1/2 x 5	29.40	I	C	3	PC	Str	Del	Rem	W-G	W-G	M-Mec	1 1/2 Tim	4.66	E-R	I-R	Hyd*	Gem	S-61 1/2	
Templar.....	122	33x4	No	Own		6-3 1/2 x 5	27.34	L	C	....	PS	T1	Dyn	Dyn	P-M&E	War	R-Sne	3/4 Sal	5.10	I-F	E-T	Mec	Ros	S-54	
Velie.....56&58	118	32x4	Yes*	Own	56	6-3 1/2 x 4 1/2	24.33	I	C	4	FP	Str	Wes	Wes	P-B&B	Dur	M-Thi	1 1/2 Tim	5.10	E-R	I-R	Hyd*	Ros	S-55	
Westcott.....48	125	32x4 1/2	Yes*	Cont	12X	6-3 1/2 x 5 1/2	29.40	L	A	3	PS	Ray	Del	Del	P-B&B	B-L	M-Pet	1 1/2 Tim	4.45	E-R	I-R	Mec*	Lav	S-59	
Westcott.....44	120	32x4 1/2	Yes*	Cont	8R	6-3 1/2 x 4 1/2	27.34	L	C	4	PC	Str	Del	Del	P-B&B	War	M-Pet	1 1/2 Col	4.90	E-R	E-T	Mec*	Gem	S-57 1/2	
Westcott.....60	118	32x4	Yes*	Cont	8R	6-3 1/2 x 4 1/2	27.34	L	C	4	PC	Str	Del	Del	P-M&E	War	M-Pet	1 1/2 Col	4.63	E-R	E-T	Mec*	Gem	S-56	
Wills Ste. Claire.....A&B68	121	32x4 1/2	Yes*	Own	A68	8-3 1/2 x 4	33.80	I	C	3	FP	Zen	Del	Del	P-Own	Own	M-Spi	1 1/2 Eat	4.45	E-R	I-R	None	Own	S-54 1/2	
Willys Knight.....64&67	118	32x4	No	Own	64	4-3 1/2 x 4 1/2	21.03	X	C	3	PS	Til	A-L	A-L	D-Own	Own	R-Own	3/4 Tim	4.44	E-R	I-R	None	Own	S-55	
Willys Knight.....A-2	124	32x4 1/2	Yes*	Own	64	4-3 1/2 x 4 1/2	21.03	X	C	3	PS	Til	A-L	A-L	D-Own	Own	R-Own	3/4 Tim	5.12	E-R	I-R	None	Own	S-55	
TAXICABS																									
Checker.....	117	33x4 1/2	No	Buda	WTU	4-3 1/2 x 5 1/2	22.50	L	C	3	PC	Zen	Sci	Wes	D-Ful	Ful	Blo	3/4 Col	4.87	E-R	I-R	None	Jon	S-57 1/2	
Driggs.....	108 1/2	30x3 1/2	No	Own		4-2 5/8 x 4 1/2	11.03	L	C		PS	Zen	Bos	Bos	D-Ful	Ful	Spi	3/4 Own	4.74	E-R	I-R	None	Own	S-	
Elcar.....4	118	33x4 1/2	No	Lycro	CF	4-3 5/8 x 5	21.03	L	A	5	PC	Car	A-L	A-L	P-B&B	Mun	Pet	3/4 Sal	4.75	E-R	I-R	None	CAS	S-51	
Elcar.....6	118	33x4 1/2	No	Cont	8R	6-3 1/2 x 4 1/2	27.34	L	C	4	PC	Str	Del	Del	P-B&B	War	Spi	3/4 Sal	4.75	E-R	I-R	None	Gem	S-52	
Kelsey.....E	112	32x4	No	Lycro	CH	4-3 1/2 x 5	19.60	L	A	5	PC	Zen	Bos	Bos	P-B&B	W-M	M-Spi	3/4 Sal	5.10	E-R	I-R	None	Lav	S-55	
Pennant.....	115	33x4 1/2	No	Buda	WTU	4-3 1/2 x 5 1/2	22.50	L	B	3	PC	Zen	Bos	Bos	D-Ful	Ful	Blo	3/4 Col	4.87	E-R	I-R	None	Jon	S-57	
Premier.....4A	118	33x4 1/2	No	Buda	WTU	4-3 1/2 x 5 1/2	22.50	L	B	3	PC	Zen	Bos	Bos	D-Ful	Ful	Blo	3/4 Col	4.70	E-R	I-R	None	Ros	S-57 1/2	
Rauch & Lang.....T	112	32x4	No	Buda	WTU	4-3 1/2 x 5 1/2	22.50	L	B	3	PC	Zen	Bos	Dyn	P-Det	Det	Spi	1 1/2 Sta	5.10	E-R	E-T	None	Gem	S-59 1/2	
Rauch & Lang**.....	102	33x4 1/2	No	Own	Electric								N-E	N-E	None	Own	Own	Own	8.60			None	Gem	S-58	
Reo.....V	113	33x4 1/2	Yes*	Own	T-6	6-3 1/2 x 5	24.30	G	A	4	PS	Sch	N-E	N-E	D-Own	Own	Own	1 1/2 Own	4.70	E-R	I-R	None	Own	S-55	
Traveler.....	108 1/2	32x4	No	Buda	WTU	4-3 1/2 x 5 1/2	22.50	L	B	3	PC	Zen	Eis	Eis	B-L	W-M	Spi	Col	.....	E-R	I-R	None	Gem	S-	
White.....15A	119	34x4 1/2	No	Own		4-3 1/2 x 5 1/2	22.50	L	C	3	Sp	PS	Opt	Opt	P-Own	Own	Own	1 1/2 Own		E-R	I-R	None	Own	J-	
Willys Knight.....A.B.C.	118	32x4 1/2	Yes*	Own	64	4-3 1/2 x 4 1/2	21.03	X	C	3	PS	Til	A-L	A-L	D-Own	Own	Own	3/4 Own	5.12	E-R	I-R	None	Own	S-55	
Yellow.....0-4	109	22x4 1/2	No	Cont	V7	4-3 1/2 x 5	22.50	L	C	3	PC	Zen	Bos	N-E	D-B-L	B-L	Spi	3/4 Tim	4.90	E-R	E-T	None	Gem	56	
Yellow.....A-2	109	29x4 1/2	Yes	Cont	V7	4-3 1/2 x 5	22.50	L	C	3	PC	Zen	Bos	N-E	D-B-L	B-L	Spi	1 1/4 Tim	4.90	E-R	E-T	None	Gem	56	

## TAXICABS

## ABBREVIATIONS—

\*—Electric  
 †—Generator only  
 \*—At extra cost  
 †—On Phaeton models  
 A—Aluminum  
 Anst—Ansted  
 Ad—Adams  
 A-K—Atwater-Kent  
 A-L—Auto-Lite  
 B—Semi Steel  
 Bal—Ball & Ball  
 B & B—Borg & Beck  
 B-F—Both Internal and External Four Wheels  
 Bij—Bijur  
 B-L—Brown-Lipe  
 Blo—Blood  
 Bos—Bosch  
 C—Cast Iron  
 Car—Carter  
 CH—Chilmax  
 Col—Columbia  
 Con—Connecticut  
 Cont—Continental

D—Multiple Disk  
 Del—Delco  
 Det—Detroit  
 De J—De Jon  
 Dit—Ditwiler  
 Doo—Dooley  
 Dt—Detroit  
 Dues—Duesenberg  
 Dur—Durstun  
 Dyn—Dyneto  
 E—Full Elliptic  
 E-F—External Four Wheels  
 E-R—External Rear Wheels  
 E-T—External Transmission  
 Eat—Eaton  
 F—Full Floating  
 Fall—Falls  
 FH—Flint  
 FP—Full Pressure to all bearings including wrist pins  
 Ful—Fuller  
 1/2 F—Semi-Floating  
 3/4 F—Three-Quarter Floating  
 G—Head and Side  
 G-D—Gray & Davis  
 Gem—Gemmer

G-L—Grant-Lees  
 Goo—Goodrich  
 H—Horizontal  
 Har—Hart  
 Hol—Holley  
 Hoo—Hoosier  
 H-Sp—Herschell-Spillman  
 Hyd—Hydraulic  
 I—In Head  
 I-F—Internal Four Wheels  
 I-R—Internal Rear Wheels  
 J—Three-Quarter Elliptic  
 Jac—Jacox  
 Jax—Jaxon  
 Joh—Johnson  
 Jon—Jones  
 K—Cone  
 Kin—Kingston  
 L—L Head  
 Lav—Lavine  
 Lon—Long  
 L-N—Leece-Neville  
 Lyco—Lycoming  
 Mar—Marvel  
 M—Metals  
 M & E—Merchant & Evans

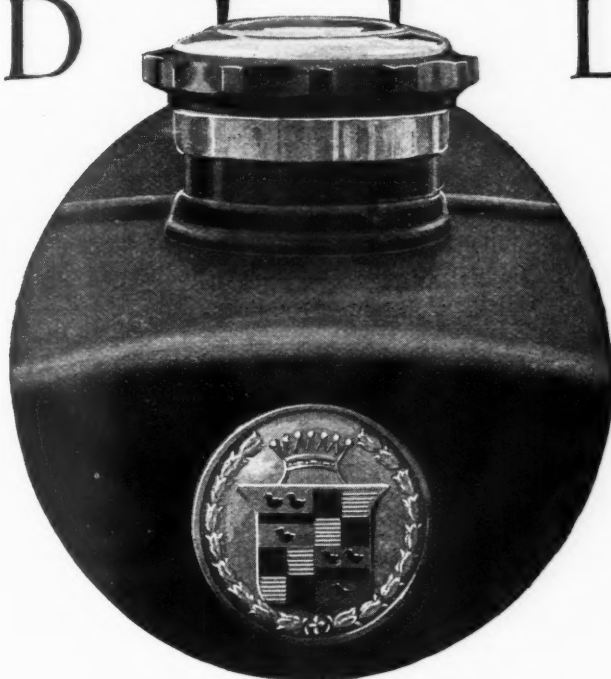
Mec—Mechanics  
 Mons—Monson  
 Mun—Muncie  
 N—Platform  
 Non—None  
 N. E.—North East  
 Nor—Northway  
 O—Special Type  
 Opt—Optional  
 P—Single Plate  
 PC—Pressure to all Crankshaft and connecting rod bearings  
 Pen—Penfield  
 Pet—Peters  
 Pic—Pick  
 PS—Splash with Pressure  
 Q—Quarter Elliptic  
 R—Fabric  
 Ray—Rayfield  
 Rem—Remo  
 Roc—Rockford  
 Ros—Ross  
 S—Semi Elliptic  
 Sal—Salisbury  
 Sch—Schebler  
 Sei—Seintilla

Sco—Scoe  
 Sne—Snead  
 Spe—Special  
 Spi—Spicer  
 Spl—Splittorf  
 S. E.—Standard Equipment  
 Sta—Standard  
 Ste—Stewart  
 Str—Stronberg  
 T—T Head  
 The—Thermoid  
 Thi—Thiemo  
 Til—Tillotson  
 Tim—Timken  
 Uni—Universal  
 V—Cantilever  
 W-G—Warner Gear  
 W-M—Willys-Morrow  
 Wag—Wagner  
 War—Warner  
 Weld—Weidely  
 Wes—Westinghouse  
 Wis—Wisconsin  
 X—Sleeve  
 Zen—Zenith



# You can succeed with

# C A D I L L A C



After all, an automotive Dealer's success depends very largely upon the public's estimate of his product. No Dealer needs to be told what people think of the Cadillac. Every Dealer knows it is more nearly *pre-sold* than any other similarly-priced automobile.

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Largest selling Car at Its Price or higher.  
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*The newest and  
most improved idea!*

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## *Regenerator* FOR FORD CARS

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**K**INGSTON has perfected a tremendously efficient and entirely new equipment unit for Ford cars. It is the latest addition to a famous line.

The Kingston Regenerator for Ford cars is a unit of constant heat application to every drop of fuel consumed. It is a definite step ahead in heat application. Its special advantages are easier starting, a much wider range of flexibility, increased power and marked economy of operation.

It differs in design from any other device on the market, and is vastly different in operation.

It is *not* a "hot-spot."

The Kingston Regenerator for Ford cars is the FINISHED product of years of experiment by Kingston engineers, and the trade may await it with full confidence that it complies in every way with the standard that has been consistently maintained in all Kingston products for more than a quarter of a century.

Let us tell you *all* about it.

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### BYRNE, KINGSTON & CO.

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KOKOMO : INDIANA : U. S. A.



# For Over 14 Years Lycoming Has Produced Good Fours

FOR many years now the main and connecting rod bearings in all Lycoming Fours have been Federal-Moguls.

When a manufacturer starts to use Federal-Mogul bearings or bearing metals he usually continues to use them. Fair treatment, reliable deliveries and the highest standard of quality keep him satisfied with his source of supply.

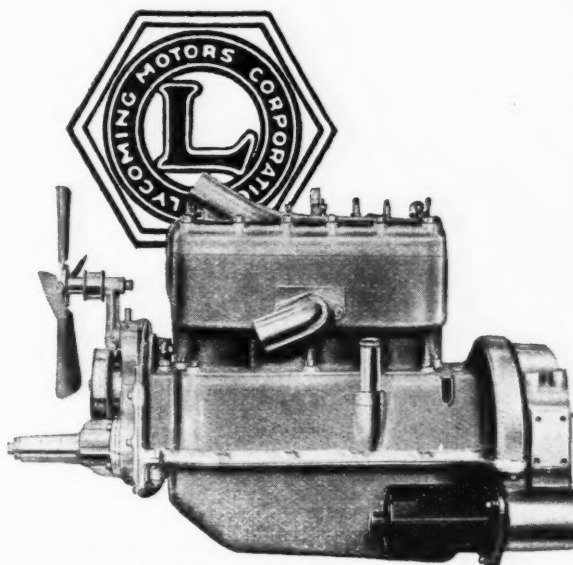
The Lycoming Manufacturing Company say themselves that before introducing their new eight in line, their experiments and tests were continued beyond any ordinary requirements that they might accomplish every possible refinement.

The fact that Lycoming continues to use Federal-Mogul bearings must mean that they have endured every test and proven themselves supremely good.

*In addition to standard bearings, Federal-Mogul Corporation manufactures two special types of patented bearings—Radiated bearings especially designed to run cool and Close-limit Interchangeable bearings. Both of these bearings have distinctive advantages. Write us for descriptive information.*

## The Federal-Mogul Complete Line

Bronze Back Babbitt  
Lined Bearings  
Die Cast Babbitt  
Bearings and Bushings  
Bronze Bushings  
Bronze Washers  
Bronze Castings  
Babbitt Metals  
Bronze Cored and Solid Bars



Lycoming Model K 4-cylinder Motor. Main and connecting rod bearings are Federal-Moguls.

## FEDERAL-MOGUL CORPORATION

A Consolidation of MUZZY-LYON CO. and the  
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DETROIT, MICH.

# Federal Mogul



"A manufacturer's reputation is safe with Federal-Mogul products"

# A Great

## Willys-Knight LANCHESTER Which Removes



### Hiram Percy Maxim

*President of Maxim Silencer Company*

"The Lanchester Balancer certainly takes out the vibration. It makes the motor smoother than most of the six and eight cylinders on the road today."



### Maurice Olley

*Production Engineer of Rolls-Royce of America, Inc.*

"From the demonstration there is no doubt that the elimination of the inherent harmonic vibration by means of the rotating balancer has been attained in practice to a degree which is very satisfying to the passenger."

### Glenn Curtiss

*Aeroplane Inventor and Builder*

After a demonstration in the new Willys-Knight Sedan fitted with the Lanchester Balancer, the famous aeroplane authority says—"It is surprising. I drove the car at all speeds up to 50 miles an hour and found absolutely no engine vibration. I congratulate you on having secured the American rights for the Balancer, which I consider a remarkably efficient device."



### G. A. Ungar

*Consulting Engineer of New York*

"The smoothness of the engine's operation up to 45 miles per hour, the maximum we dared to reach within New York City limits, was particularly apparent and I have no doubt that the power output of this engine is materially higher than for the same engine without the Balancer."

"The automobile owners of this country owe you a debt of gratitude for making Mr. Lanchester's design commercially available in America."



### F. E. Edwards

*Technical Chairman, American Automobile Association*

"Being one of the early Knight motor enthusiasts, the smoothness of the motor did not surprise me. I requested the driver to take the car through all speeds from 15 miles per hour, a mile at a time increase, up to a little over 40 miles per hour—and I am free to confess that if there were any periods in that motor I missed them entirely."



### W. E. Best

*Works Manager of the Remington Cash Register Co., formerly of the National Cash Register Co.*

"The smoothness of the motor was a revelation to me. The driver increased the speed from fifteen miles an hour to approximately 45 miles, and as far as I could detect, with no vibration. It would seem that the Balancer gives six cylinder operation as far as smoothness is concerned."

# WILLYS-



# Discovery

## Adopts the new BALANCER Vibration ~ ~ ~



K. H. Condit &  
F. H. Colvin

Editors of American Machinist



"We have just had the pleasure of examining carefully your new Willys-Knight Sedan, equipped with the Lanchester balancer. At 20 miles an hour we found the car as smooth as an electric. At 35 where we expected the vibration point to be, there wasn't any. So far as we could tell, the performance of this car was quite as smooth as that of any six cylinder car we have seen."

As everybody knows, automotive engineers the world over have been striving for years to conquer vibration—and it has remained for the Willys-Knight to bring to the people of America the great discovery that eliminates vibration.

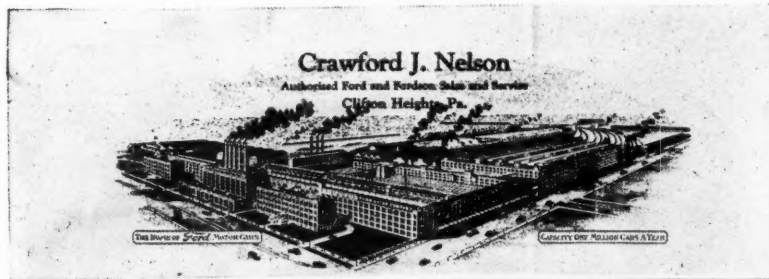
By an ingenuity of engineering as amazing in its simplicity as it is in its results, the new Willys-Knight now gives the motor car industry an entirely new conception of vibrationless engine-running.

The Lanchester Balancer is the invention of Dr. F. W. Lanchester, F. R. S., one of the foremost automobile engineers of Great Britain, and builder of one of the most expensive motor cars in the world.

With this new smoothness, coupled with the fact that the Willys-Knight sleeve-valve engine improves with use—Willys-Knight puts every money-making advantage in the hands of the Dealer. Write for Franchise details.

WILLYS-OVERLAND, INC., TOLEDO, OHIO - WILLYS-OVERLAND SALES CO. LTD., TORONTO, CANADA

# OVERLAND



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July 21, 1924.

David Lupton's Sons Co.,  
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Dear Sirs:

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Yours very truly,

*Crawford Nelson*



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More Than  
**135**  
Manufacturers of  
Passenger Cars  
and Trucks

## Use Stromberg Carburetors as Standard Equipment

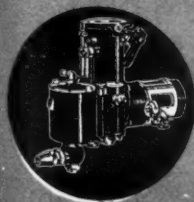
When the big majority of America's manufacturers of pleasure cars and trucks specify and use Stromberg Carburetors as standard equipment—there's a reason and a mighty good one. They know that the Stromberg Carburetor utilizes every drop of gas that passes through it, which means real economy. These same wise manufacturers know by actual tests that Stromberg means flexibility, easier starting, more power and smooth operation.

Hundreds of Stromberg dealers are enjoying the satisfaction that comes from big sales and liberal profits on Stromberg Carburetors. You too, can build up a substantial Carburetor business with this fast-selling economy carburetor.

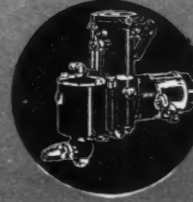
Write us! Do it now, ask us to send you complete facts pertaining to a special sales and co-operation plan for Stromberg dealers. If you are desirous of greater business success sell Stromberg Carburetors and give your customers lasting satisfaction.

*A special Stromberg carburetor for every car*

The Stromberg  
Motor Devices Co.  
Dept. 827A  
64 E. 25th Street  
Chicago, Ill.



New **STROMBERG** Does it!  
CARBURETOR



## The Value of the Peerless Franchise

Permanent success in the automobile business depends on three things:

A line of automobiles that will sell—  
and give satisfaction after they are sold;

A manufacturing company that has  
stability and permanence;

A selling agreement that allows the  
dealer to make a good profit on each sale.

These three essentials to permanent profits in the automobile business are embodied in the sales franchise covering the Peerless Eight and Peerless Six.

D. A. BURKE

*President and General Manager*



## A Powerful Force Is

Powerful, prestige-building advertising in both national publications and newspapers is part of the Peerless Motor Car Company's consistent campaign to stimulate sales for Peerless distributors and dealers.

Color advertisements in the Saturday Evening Post, combine the appeals of those two wonderful cars, the new Peerless Six and its famous consort, the Peerless Eight. There is also an impressive series of Peerless advertisements in full colors appearing in such publications as Vogue, Vanity Fair and House & Garden.



## Isn't This the Kind of a Car to Handle?

The instant success that this Company has had with the Peerless line in Montclair, N. J., prompts my writing you to let you know of the complete satisfaction there is in selling a car like the Peerless.

In spite of the fact that a large percentage of the residents of this territory are away from home in the months of June, July and August, we have sold and delivered six of the new Peerless Six Cylinder Model 70 Sedans in the last three weeks.

The writer is just entering upon his twentieth year in the automobile business, always selling cars of the more expensive type and can frankly say that these cars were America's representative automobiles, and never, during this period, have I had the pleasure of selling cars with so little effort expended as is necessary to sell the Peerless.

You have undoubtedly heard a great many men say that they were waiting for their "Ship to Come In." I'll say that mine "Is In", having DOCKED about three weeks ago at which time I received my first Peerless Cars.

So easy is it to sell the Peerless Car that we have nicknamed it, "The Two Call Car." This name came about by the fact that two calls are all that is necessary to put a Peerless in the prospect's home. No. 1 call is when we call on the prospect to show the car to him, and No. 2 call is usually 24 hours later, when the prospect calls us requesting us to take his order for the car for delivery as quickly as possible.

Another item that we feel very proud of is the fact that the owners of Peerless cars that come in our Service Station are very enthusiastic in their praise of the Peerless product and have nothing but good to say about their cars. This, coupled with the wonderful cooperation given the dealer by the Peerless factory makes, in our judgment, the Peerless Franchise one of the most valuable automobile connections that can be had from the dealers standpoint.

Very truly yours,

July 16, 1924.

FRANKLIN MONTCLAIR COMPANY  
(signed) Walter R. Christopher

## Stimulating Peerless Sales

Can you think of a keener combination, from the dealer's standpoint, than a superb Eight and a moderate priced Six—both worthy of that grand old name, Peerless—backed by a sales and manufacturing organization of the highest rank—and strengthened by advertising that pulls?

There are still a few openings for high grade sales organizations in the Peerless roster. Wire, phone or write for particulars.

THE PEERLESS MOTOR CAR COMPANY, CLEVELAND, OHIO

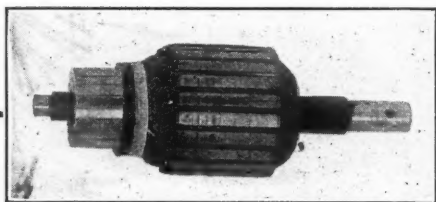
*The Matchless Peerless Eight and the New Peerless Six*



# A Rewound Armature Shipped same day old one is received!



*We have regular customers in all  
parts of the country*



## PRICE LIST

### Net Prices

Ford Generator Armatures.....	\$ 1.95
Ford Starter Armatures.....	2.00
Any Make of Two Unit Generator Armatures.....	4.95
Any Make of Two Unit Starter Armature Rewound.....	6.75
Motor Generator	
Northeast.....	11.00
Simms Huff.....	7.00
Delco.....	12.00
Dyneto.....	12.00
Detroit.....	12.00
Any Vacuum Cleaner Armature.....	3.50

THIS promptness has made it possible for garage and service men in all parts of the country to profit by our service.

When a defective armature comes into their shop they simply ship it to us—the day it is received a rewound armature (absolutely guaranteed to give service equal to a new one) is mailed to them.

Nothing left but to replace the rewound armature and render bill!

This service saves the customer many dollars over the cost of a new armature and pays the garageman an equal if not greater profit!

Quantity production (1500 rewind jobs a day) justifies our low prices.

A trial rewind job will prove to you the quality of our work—the promptness of our service—and the profit for you in our service! Mail your next rewind job to

**H. M. FREDERICKS CO.**

Lock Haven

Penna.

---

**H.M.FREDERICKS CO.**  
*Armature Winding Specialists*  
Lock Haven Penna.

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# AC SPARK PLUGS

A safe investment.

The best known, easiest selling and most profitable spark plugs.

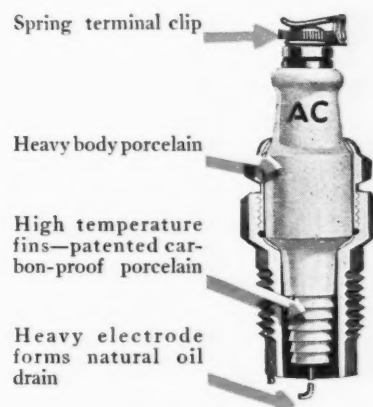
Backed up by the factory equipment business of more than 200 manufacturers.

Nationally advertised through magazines, newspapers, painted boards, store signs, window displays and direct advertising, which creates a big demand for them.

## AC 1075 SPARK PLUGS

*A good plug for  
Fords*

The AC 1075 Spark Plug for Fords  
is a big seller and money maker.



## AC SPEEDOMETERS



The quality of AC Speedometers is proven by the fact that they are equipment on BUICK, CHEVROLET, CHRYSLER, GRAY, HAYNES, LEXINGTON, MAXWELL, OAKLAND and OLDSMOBILE.

### THE MODEL FOR FORDS

Complete with all attachments. The new AC Direct Drive has done away with the swivel joint. Easily sold because of their high quality and national advertising.

SELL AC PRODUCTS—THEIR QUALITY AND  
POPULARITY ASSURES DEMAND AND PROFIT

AC-SPHINX  
Birmingham  
ENGLAND

AC Spark Plug Company, FLINT, *Michigan*

*Makers of AC Spark Plugs—AC Speedometers*

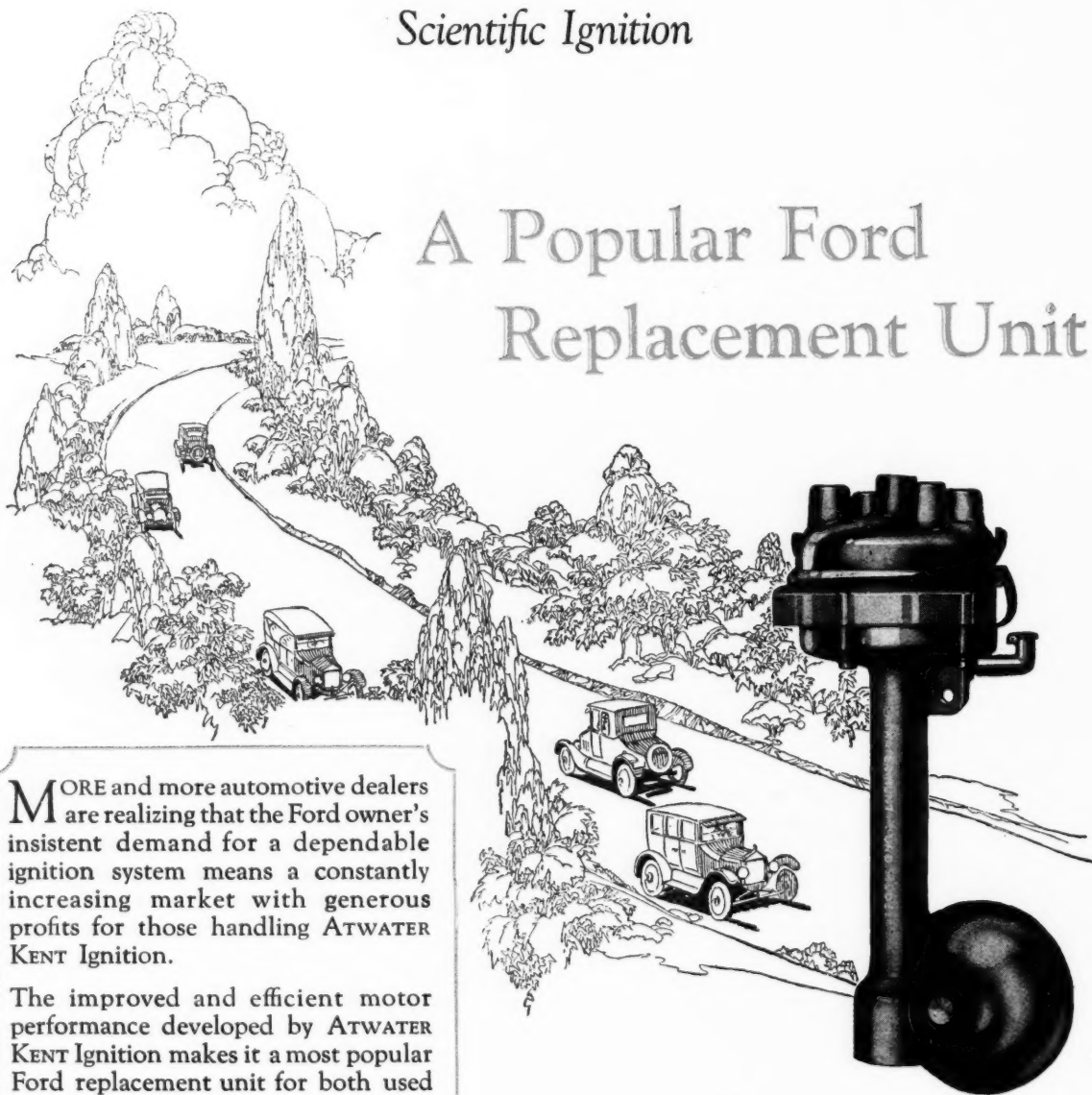
U. S. Pat. No. 1,135,727, April 13, 1915; U. S. Pat. No. 1,216,139, Feb. 13, 1917. Other Patents Pending

AC-OLEO  
Levallois-Perret  
FRANCE

# ATWATER KENT

*Scientific Ignition*

A Popular Ford  
Replacement Unit



**M**ORE and more automotive dealers are realizing that the Ford owner's insistent demand for a dependable ignition system means a constantly increasing market with generous profits for those handling ATWATER KENT Ignition.

The improved and efficient motor performance developed by ATWATER KENT Ignition makes it a most popular Ford replacement unit for both used and new cars.

Easily installed without removing the radiator.

ATWATER KENT MANUFACTURING COMPANY  
4957 Stenton Avenue, Philadelphia

Price **\$10<sup>80</sup>**

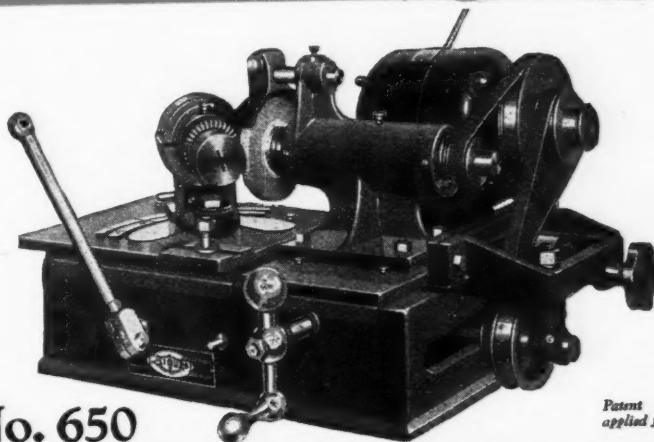
*Including cables and fittings*





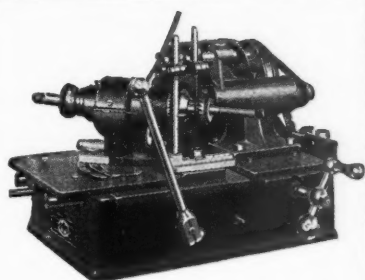
## VALVE FACE GRINDING MACHINE

No. 650

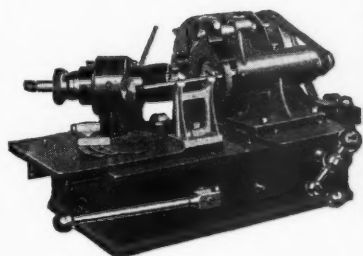


Patent  
applied for.

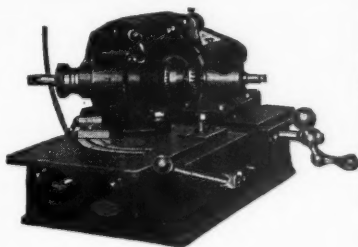
Grinding Valve Face



Sharpening Valve Seat Reamer



Truing Valve Stem Ends



Reseating Valve Cage

**T**HIS power-driven machine introduces a new standard of accuracy and speed on the important jobs of engine repairing. Saves time and labor, increases volume of work done. Handy and easy to use; simple, quick adjustments.

Grinds any valves up to  $4\frac{1}{2}$  inches, with stem capacity of  $\frac{5}{8}$  in. and under. It has marked adjustment stops for valve angles of 30, 45 and 60 degrees but grinds at any other angle required. When valve stem is pushed through chuck into machine it fits into a tapered end which acts as a guide and a stop on end of valve stem.

Sharpens any Sioux Valve Seat Reamers.

Reseats any removable valve cages, by chucking the reamer on the upper end of the pilot stem. In this work the speed of the chuck can be regulated to the most favorable rate for facility and accuracy.

Truing valve stem ends is a quick, easy job with this machine. With right hand hold valve stem in V bracket with end against emery wheel; with the left hand hold valve head and twist valve while grinding to do good job. No need to fasten down valve stem. You can grind the ends of 12 valves in about one minute.

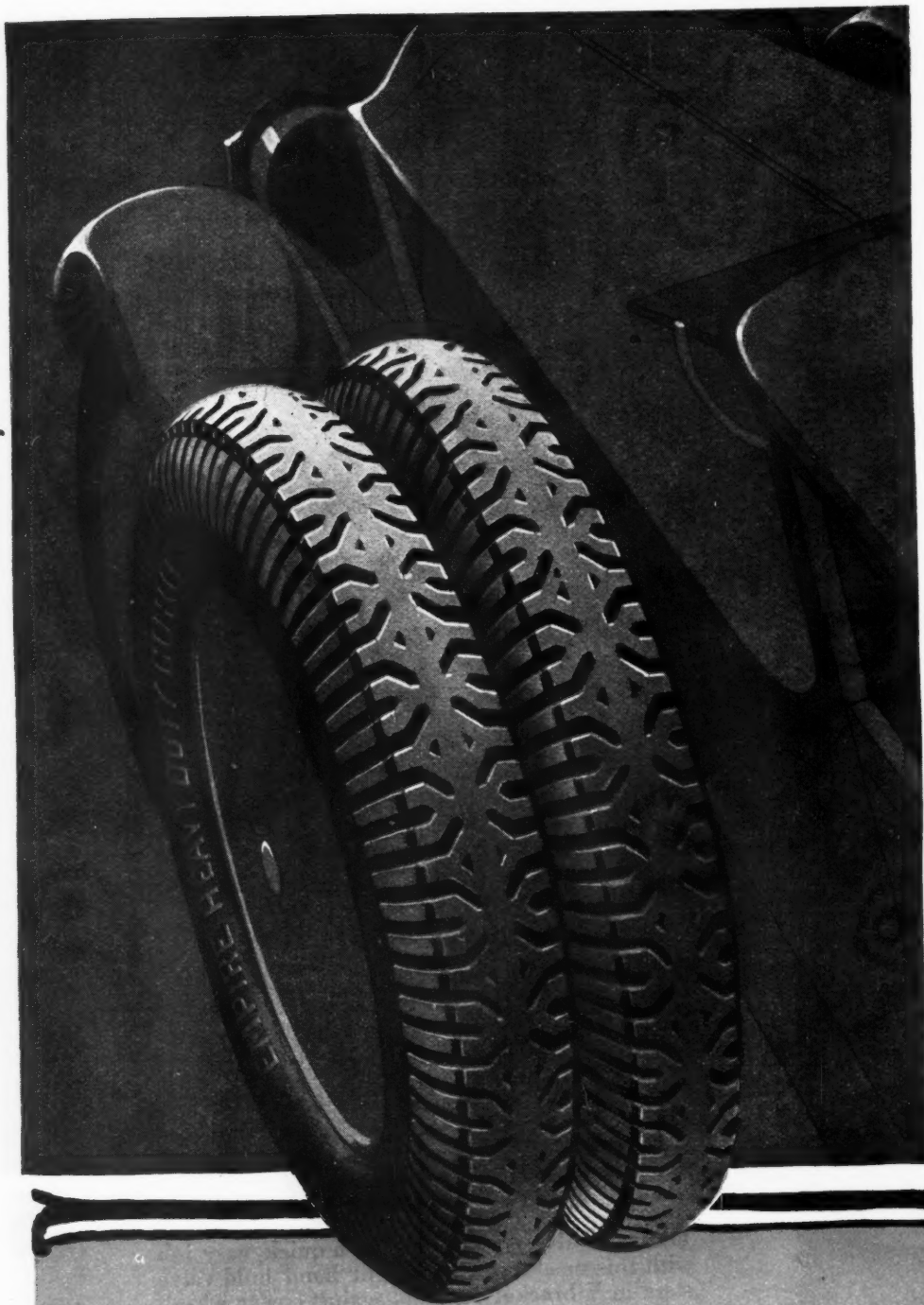
Equipped with a standard make chuck and driven by a  $\frac{1}{4}$  h.p. electric motor. Write for full information.

### Ask Your Jobber about It

ALBERTSON & CO.  
Sioux City • • Iowa



The Best-Equipped Shop  
Gets the Business



*Just A Few Features Of.*  
**EMPIRE HEAVY DUTY CORDS**

Fifty per cent longer mileage.

More rugged than other tires of corresponding sizes.

Tread brought completely down side wheel to serve as extra reinforcement and prevent curb and rut wear.

A layer of live rubber between each ply to give extra resiliency.

Require 40% less air pressure thus giving balloon comfort without the increased puncture hazard of the regular balloon tire.

Non-skid under the most severe conditions.



# An important announcement

You can now buy Empire Heavy Duty Cords in all sizes at a price no higher than you have been paying for regular cords.

JUST a year ago Empire Tire builders put out the now famous Empire Heavy Duty Cord. Production was then limited to five sizes only—for limousines, trucks and heavier pleasure cars.

It marked the realization of a fond ambition—a tire unsurpassed in quality of material, in appearance, long mileage and durability. The price, at first, naturally was high. These remarkable casings were of necessity limited to the use of those owners of expensive cars who demanded the utmost in quality without regard to price.

Even in this limited field the demand became so great that we were forced to increase production facilities to such an extent that we can now offer them—in all sizes—at prices no higher than you have been paying for regular cords.

## *Take Advantage of This Opportunity Immediately*

Empire Heavy Duty Cords have proven that they sell on sight. Owners of expensive cars considered them a bargain no matter what was charged. Every car owner will eagerly grasp the opportunity to buy them at the regular price.

For further information address

EMPIRE TIRE AND RUBBER CORPORATION  
TRENTON, NEW JERSEY

# Empire

## HEAVY DUTY CORD

# From Sales Manager in Los Angeles

**MOON Popularity in Los Angeles**

The following is a list of cars MOON outsold in May, 1924, in Los Angeles City, exclusive of Hollywood, according to Automobile Publishing Company:

MOON	27
Packard	26
Hudson	23
Essex	21
Rickenbacker	20
Peerless	18
Rollin	17
Hupmobile	17
Flint	16
Lincoln	15
Cleveland	13
Lexington	12
Paige	11
Nash "Four"	11
Wills St. Claire	10
Jordan	10
Reo	9
Franklin	8
Marmion	7
Gray	6
Cole	6
Kissel	5
Sterling-Knight	4
Durant	4
El Car	3
Valie	3
Stearns-Knight	3
Chalmers	3
Barley Six	3
Stephens	2
Pierce Arrow	2
Apperson	2
Case	2
Haynes	2
Gardner	2
Dort	2
LaFayette	2
McFarlan	2
Westcott	2
Auburn	2
Columbia	1
H. C. S.	1

**See who MOON outsold**

Moon leads in popularity because it is months in advance in offering a full size 6-cylinder car with Permanent Top, Duco Satin Finish which is impervious to California sun, Hydraulic 4-Wheel Brakes, full size Balloon Tires and Ross Steering Gear.

Because Moon is made of standard proven units throughout, it commands a higher re-sale value than any other car selling for the same price new, according to all authoritative publications on second-hand values.

The Moon line is complete—offering a wide range of preference in distinctive models from Roadster and Touring to 4-door Petite Sedan.

Count the Moon cars on the street—they tell the story.

**Moon Touring with Hydraulic 4-Wheel Brakes and Balloon Tires, \$1495, Delivered here.**

**DON P. SMITH, Inc.**  
1225 S. Flower St. BRADLEY 251

**Associate City Dealers**

Harrigan & Cleveland, 2500 So. Figueroa St.  
Pipher Bros., 1064 So. Main.  
Harding Motor Co., 2264 West 10th St.  
Los Angeles County Dealers  
B. A. ANDERSON, 622 East 9th St. Phone 1000.  
DORRIS MOTOR CO., 1848 Pacific Ave. Near Palms.  
G. I. HANSEN, 176 North Main, Englewood.  
PALMDENA MOTOR CO., 41 South Broadway, Palmdale.

Hollywood Moon Sales Co., 1230 N. Western Ave.  
Crown Motor Co., 1020 So. Figueroa St.  
Hubert Carriage, 2934 W. Pine.  
PENN MOTOR CO., 410 East Broadway, Glendale.  
NORTH RICHIE MOTOR CO., 400 P. Anaheim, Long Beach.  
E. M. J. & B. BAKER, 1511 1/2 E. Pacific, Hawthorne Park.  
W. S. CLARKSON, 110 Broadway, Santa Monica.

# MOON



# to Tenth Distributor -- in One Year

## *What Don Smith Did You Can Do, Too*

A year ago Don Smith was a sales manager for one of the big Los Angeles distributors.

Today he is one of the biggest Los Angeles distributors, *himself*—ranking tenth in volume of sales.

This is the kind of copy he is running in Los Angeles today—and every word of it is true.

Don Smith had the gumption to realize that if he could do so well for others, he could do better for himself—

### **If he had the right line and the right kind of contract**

He looked the field over and decided that Moon offered the greatest opportunity open—in car, in price, in resale value, in “trade-in” service. . . You can see the result from the copy on the opposite page.

You can be the Don Smith of your territory if the Moon contract is still open.

If you want to work under a 1925 contract, with an “ahead-of-the-day” 1925 car, with 1925 co-operative merchandising methods, write us at once.

It may be that we can get together as we have a few attractive openings.

MOON MOTOR CAR CO.—ST. LOUIS, MO.  
STEWART McDONALD, *President*

# MOON

**Growing Specialized Service**

Profit and Loss Statement  
Year ending June 30th, 1924.

INCOME			
Service	A	\$11,640.00	
Service	B	4,612.50	
Service	C	2,660.75	
Service	D	<u>3,125.30</u>	22,038.55

EXPENSES			
Wages		\$ 4,048.60	
Salary (Personal)		3,000.00	
Rent, Light, Heat, etc.		3,415.24	
Purchases		903.15	
Depreciation		700.00	
Miscellaneous		<u>846.47</u>	
Total			12,943.46

NET PROFIT \$9,095.09

**A GROWING SPECIALIZED SERVICE**

*KEN*

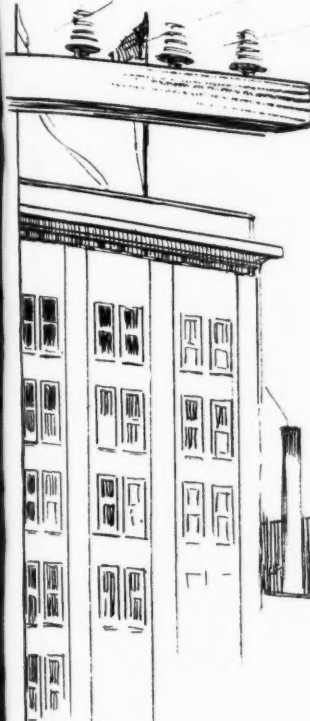
***This will interest the wide-awake dealer and service station***

A Dealer in a city of 40,000 found that "trade-ins" were eating up most of his profits. Like most other dealers, he appreciated that this condition was not likely to change in the future.

However, he wanted to make more money. Consequently, he investigated our "Specialized Service" idea and equipment and obtained an exclusive franchise for his city.

He invested \$3,500 in complete equipment and cleared over \$9,000 net the first year.





# \$9,000.00

## *Profit in one year from a \$3500 plant*

The man who is looking for a way to increase his profits easily will want to learn more about this "SPECIALIZED SERVICE" which will put cash in his bank every day of the week.

It isn't a repair shop, grease rack or oil filling station. It is a patent-protected plan for giving a service for which owners go elsewhere **right now**—paying cash for a substitute which is not as complete, takes 3 or 4 times as long to deliver and which is just as costly.

The service is used repeatedly by every owner and there is nothing complicated about the business. It uses unskilled labor.


We install the equipment, instruct your men, show you how to sell the idea and give an exclusive franchise. It is a business of large cash profits and will enable you to dominate your city.

Such plants have been successfully operated for over two years.

If you are a forward looking man and able to finance a small plant, providing the profit is assured, you are as much interested in learning the details as we are in placing them before you.

Address Box 6166,  
Motor Age,  
Chicago.

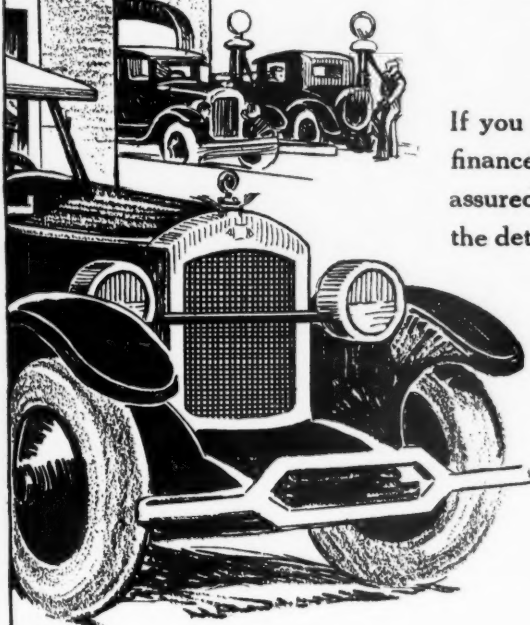
**For Convenience Use  
The Coupon To-day**

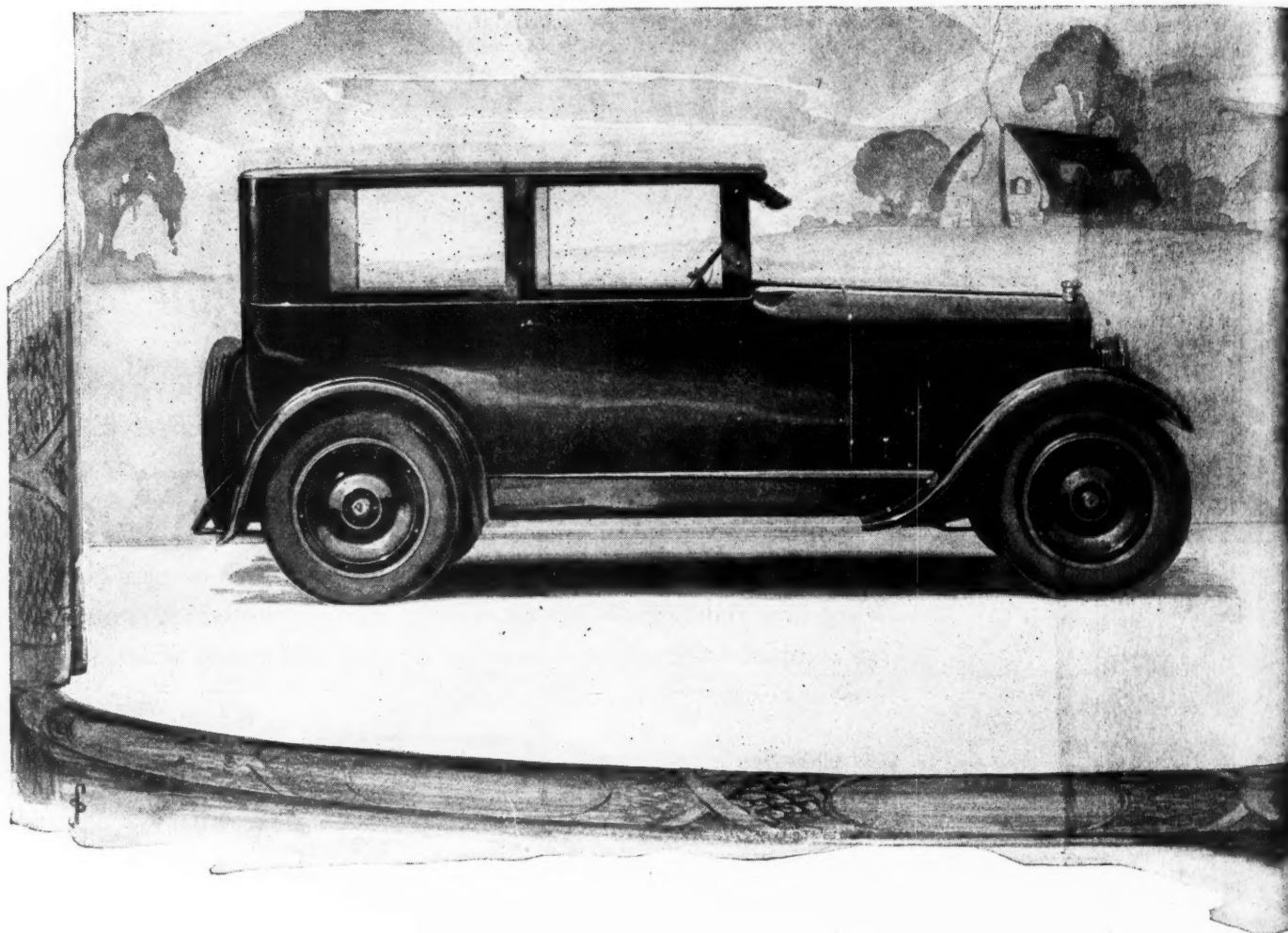


**Box 6166, Motor Age, 5 South Wabash Avenue, Chicago, Ill.**

Send full particulars of your proposition without any obligation on our part. If convinced that the profits warrant us to apply for the franchise, we are in a position to finance to the extent suggested.

Name \_\_\_\_\_  
Street Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_





# *The Curtain is*

The curtain is up!

Velie Model 60—five body types, Velie-built airplane type engine, balloon tires, and hydraulic four-wheel brakes—is ready.

In style and distinctiveness the new Velie line is being welcomed everywhere as the outstanding achievement of the year. Inner quality is characteristic of Velie.

You can sell this new Velie line.

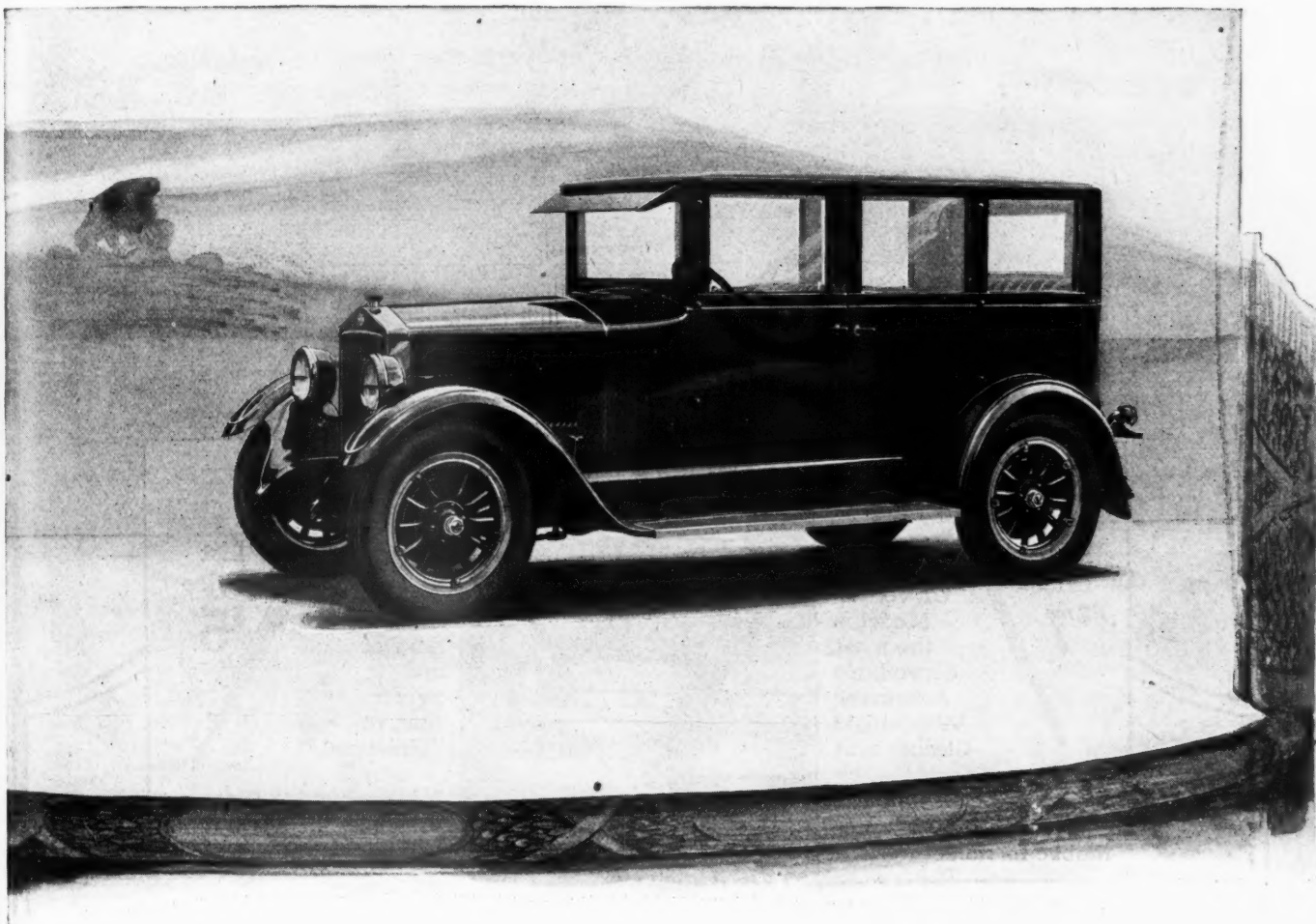
With these cars you can offer your customers more for the money—more by hundreds of dollars.

And each sale will register real profit. Our new dealer plan increases discounts and provides generous factory cooperation, for every merchant who holds our franchise.

The best way for you to meet Velie competition is to sell Velie Motor Cars. Fill out the coupon and get the whole story.

VELIE MOTORS CORPORATION  
MOLINE, ILLINOIS





# *Raised!~on the new* **VELIE**

The largest and finest Six in the world at the price—  
Five Strikingly Beautiful Models.  
Full Size Balloon Tires.  
Lockheed-Hydraulic Four-Wheel Brakes.  
118-inch Wheelbase.

MAIL THIS COUPON

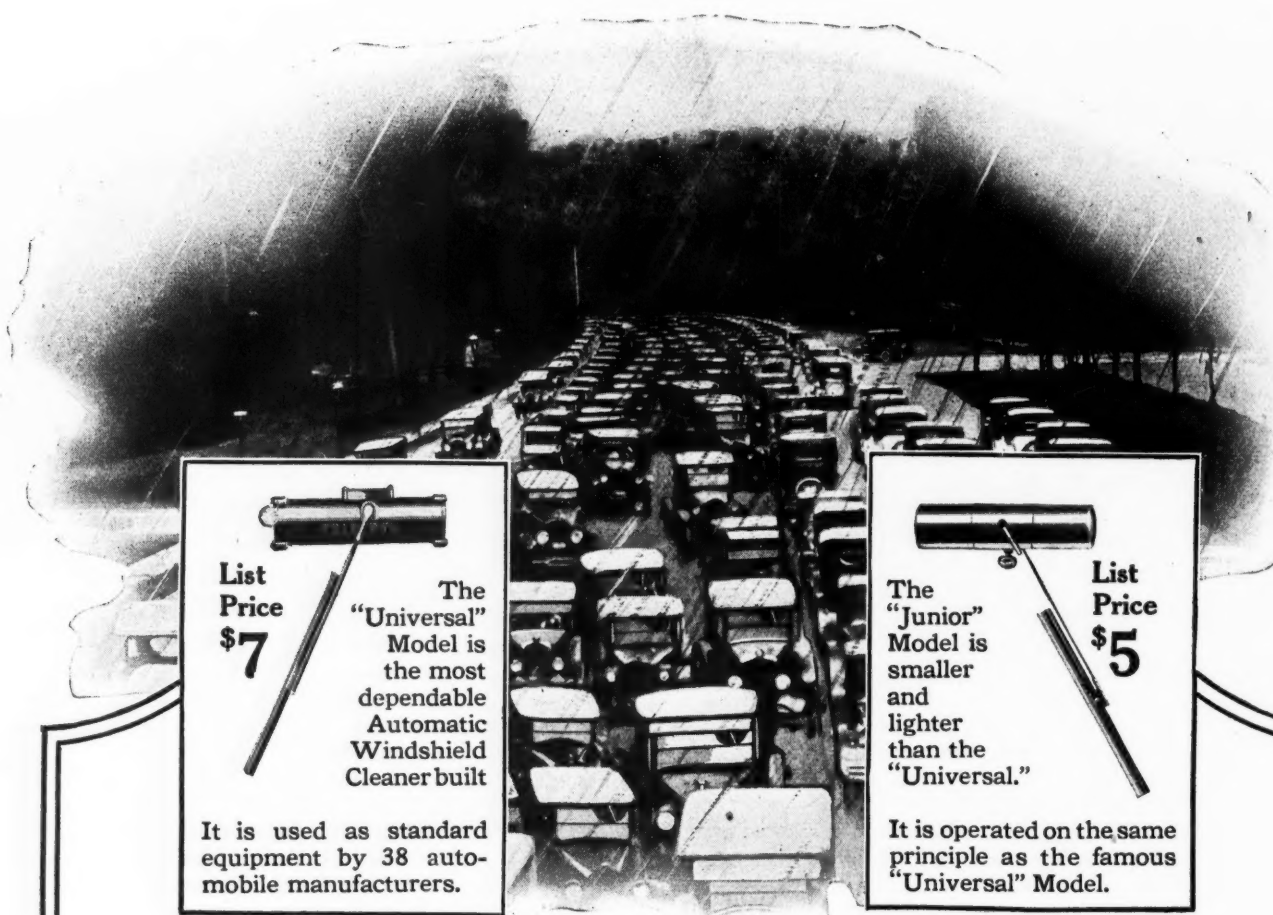


VELIE MOTORS CORPORATION  
MOLINE, ILLINOIS

(A)

I am interested in your New Money Making Dealers Proposition—  
At present am handling

My territory is \_\_\_\_\_



List  
Price  
**\$7**

The  
"Universal"  
Model is  
the most  
dependable  
Automatic  
Windshield  
Cleaner built

It is used as standard  
equipment by 38 auto-  
mobile manufacturers.



List  
Price  
**\$5**

The  
"Junior"  
Model is  
smaller  
and  
lighter  
than the  
"Universal."

It is operated on the same  
principle as the famous  
"Universal" Model.

## This is *Your* Business!

Selling Folberth Automatic Windshield Cleaners is a sure way of building up a permanent, profitable business. They have established themselves so firmly in the confidence of motorists that a minimum of effort is required to sell them. And when they are sold they *stay* sold! There are no servicing costs later to eat up your profits, because Folberths are built to last!

If you are not sharing in Folberth business, you are neglecting one of the best profit-making opportunities in the automotive field. This business is *your* business. When are you going to start? Ask your jobber or write us.

THE FOLBERTH AUTO SPECIALTY CO., *Cleveland, Ohio*

The Folberth "Parts-Kit" contains an assortment of Folberth parts — a free set of installation and adjustment tools and a liberal supply of advertising folders. Every Folberth dealer should be provided with these kits.

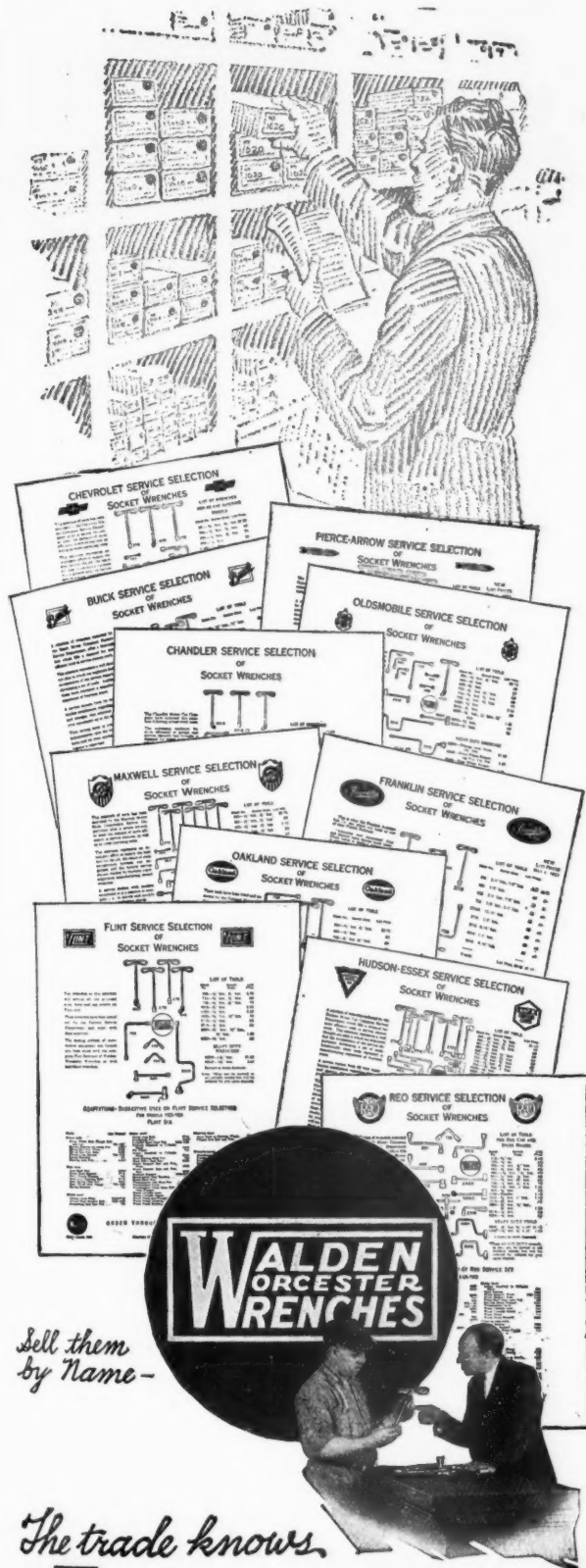


List Price

**\$11.25**



# For example —



Here's how a socket wrench Service Selection is made up from a Walden-Worcester Dealer's stock. It's easy with Walden-Worcester Service Data. This feature of the Walden-Worcester line enables you to meet the demand for complete socket wrench requirements to service the standard bolts and nuts on any particular make of popular car or truck.

*The fourth of a series of advertisements giving reasons why it pays to be a Walden-Worcester Dealer.*

Let's say you're a Walden-Worcester Dealer with a complete stock of Walden-Worcester Socket Wrenches. Jim Smith, a progressive garageman, knows about Walden-Worcester Service Selections—he's seen a Service Selection Data Sheet recommending Walden-Worcester Socket Wrenches. So Jim Smith comes to you specifying a Walden-Worcester Service Selection. He doesn't know just what sizes he requires, but you do with our data. Then it's just a matter of pulling out the corresponding stock number listed in the Service Selection from your regular stock. This is just one instance. A Walden-Worcester Dealer can do the same in making up Service Selections for all popular makes of cars and trucks—that's a flexible stock for you!

Just around the corner everywhere, there's a Walden-Worcester Jobber—buy from him.

**WALDEN-WORCESTER**  
INCORPORATED  
GENERAL OFFICES AND FACTORY  
WORCESTER, MASS.

*Sell them  
by Name—*

*The trade knows.*

**WALDEN-WORCESTER**  
*The original and largest manufacturers of Wire Handle Socket Wrenches in the World*

# From 67th to 14th Place

## The FLINT SIX

has a real record for achievement on its first anniversary!

In one year more than 15,000 Flint Six cars have been produced and sold.

In one year, from August 1, 1923, to July 31, 1924, Flint Six retail sales throughout the country exceeded \$22,000,000.

In less than one year the Flint Six climbed from 67th place to 14th place among all cars in sales.

In one year the retail sales of Flint Six motor cars in New York City—the most critical market in the world—exceeded two millions of dollars, in value.

And here is a significant fact which, in view of the known conditions in the automotive industry, stands out with remarkable clearness and prominence:

The Flint Six manufacturing schedule has been maintained exactly as planned at the beginning of 1924, notwithstanding the fact that the manufacturers of other quality and quantity cars have been forced to curtail production because of business conditions.

And every Flint Six that has been produced under the Flint Six schedule has gone to fill orders already placed by retail buyers, and not for dealers' stocks in showrooms and warehouses.

Thus the first anniversary of the Flint Six becomes an event of importance to the entire industry.

It demonstrates again that a motor car setting its own standards in value, performance and appearance sets its own standards also in the mind of the buying public.

It demonstrates that a product unquestionably superior in its

*Without question, the quality and reputation of a motor car have a great deal to do with the success of its dealers. Flint success has been unusual because the car itself is unusual. The Flint Six "Fifty-Five" line offers a range of models to suit every buyer in the medium-priced quality six field. Get the facts at first hand—see and study the car.*

*The Greatest Success  
Car of 1924—*

The FLINT SIX "Fifty-Five"

FLINT MOTOR COMPANY, FLINT, MICH.





# in less than One Year!

class receives support when other products are neglected. The more pressing business conditions may be, the more carefully motor car buyers pick and choose their cars. That is why the Flint Six has forged ahead without interruption during a period when temporary conditions required a general curtailment of production.

Flint Six achievements are individual. So is the car.

## *What Flint Success Means to Dealers*

The first anniversary of the Flint Six finds the Flint dealer organization happy and confident. The only difficulty, in the most difficult times, has been a short age of cars.

Because the Flint Six factory and sales officials demanded a sane policy in the beginning, protection was automatically extended Flint dealers against over-production, with consequent forcing of cars beyond a reasonable and safe capacity. We are sorry to have underestimated demand. But that demand will grow and increase ten-fold as the remarkable success of this fine car grows older.

Flint Six success, in view of the achievements of the past twelve months, appeals to the progressive merchandiser who can appreciate a real opportunity.

The safe and sane Flint policy of growth and dealer relations gives you that opportunity now.

You can share in the greater record for achievement which the next twelve months will show, if you can meet the essential qualifications of Flint merchandisers—among which are ability to sell quality merchandise, the confidence of your community, and the desire to become a part of an organization founded on solid rock. Write the General Sales Manager, Flint Motor Company, Flint, Mich., for more information.

## *The Opportunity of the Year for Dealers*

Big as the Flint Six "Fifty-Five" opportunity has been, it is not the Flint policy to do things by halves. That is why the Flint Six line also includes a modern, handsome, up-to-the-minute Light Six—the Flint Six "Forty". Whatever buyers want in modern equipment, the Flint line provides. And every car sold is completely equipped at the factory.



## The FLINT SIX "Forty"

FLINT MOTOR COMPANY, FLINT, MICH.



*This Instant-on display stand is made of metal and beautifully lithographed in colors. It is equipped with a sturdy easel for counter use. You will find it a highly successful salesman.*

## This Stand Sells 'em for You

**K**EEP this unique stand from getting empty and Instant-ons will sell themselves. That's the experience of retailers everywhere. The only trouble is in keeping it filled. Instant-ons go so fast.

The stand holds a dozen boxes of Instant-ons. Each individual box contains a complete set of five Instant-ons and retails for \$1.00. The cost to you is \$8.00 for the dozen—stand and all.

That means a neat 50% profit on an article that moves as rapidly as any accessory on the market.

A regular Instant-on and a valve stem are attached to the stand. This lets folks who don't know Instant-ons see how easily they work. A turn—a push—another turn, and Instant-on is on. Reverse the action and it's off. Every car owner realizes the time and trouble Instant-on saves first time he tries it. The rest is easy.

Just as a starter, order an Instant-on display stand from your jobber. You'll find it mighty good business. If your jobber can't supply you write direct to us, and we'll give your order prompt attention.

THE DILL MANUFACTURING CO., Cleveland, O.

Also Manufacturers of Dill Standard Tire Valves and Dill Valve Insides  
Manufactured in Canada by The Dill Manufacturing Company, of Canada Ltd., Toronto



### Dill Standard Valve Inside

*Another quick seller. 20 of these metal boxes containing 5 insides each are mounted on a beautiful metal display stand, lithographed in colors. Boxes retail at 30 cents each. Display stand costs \$4.20.*

# DILL

## Tire Valves and Valve Parts

# ROLLIN

The first car in America to standardize on Balloon Tires—

The only car in America designed originally for Balloon Tires—

The first popular priced car in America to introduce the internal expanding 4-Wheel Brakes.

Likewise Rollin was the first popular priced car in America to be designed originally for the internal expanding 4-Wheel Brakes.

European Type Motor

4-Bearing Crankshaft

Aluminum Alloy Pistons and Connecting Rods

Force-Feed Lubrication  
New Carburetor and Manifold

25 to 30 Miles Per Gallon of Gasoline

Transverse Rear Spring

The above advanced features make it easier to sell a Rollin—the most advanced car in America.

We would like to correspond with a few more substantial, progressive dealers.

Touring Car	-	-	-	-	-	\$ 995
Three Seated Coupe Roadster	-	-	-	-	-	1195
Five Passenger Sedan	-	-	-	-	-	1295

*Prices f. o. b. Cleveland. Tax extra.*

THE ROLLIN MOTORS COMPANY  
CLEVELAND, OHIO

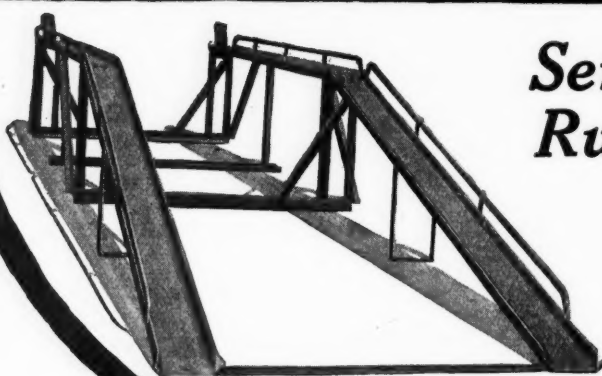




# Get a Manley

New  
Model  
Announced

As Illustrated  
\$86



Service  
Runway



## *The Manley Mfg. Co. Announces a NEW ALL-STEEL SERVICE RUNWAY*

All open in the middle—no obstructions to interfere with the workman.

**Double Legs and Extra Heavy Bracing**—tremendous strength and rigidity.

**Truss construction**—can be set up on any flat surface without any necessity for providing foundations of any kind.

**High guard rails**—makes it safe

even for inexperienced drivers. This feature inspires confidence and makes car owners prefer to come to you.

**Shipped with legs assembled**—cuts in half the time you spend setting it up after you get it. Saves trouble figuring out how it goes together as you only have to place the channels on the legs and bolt together.

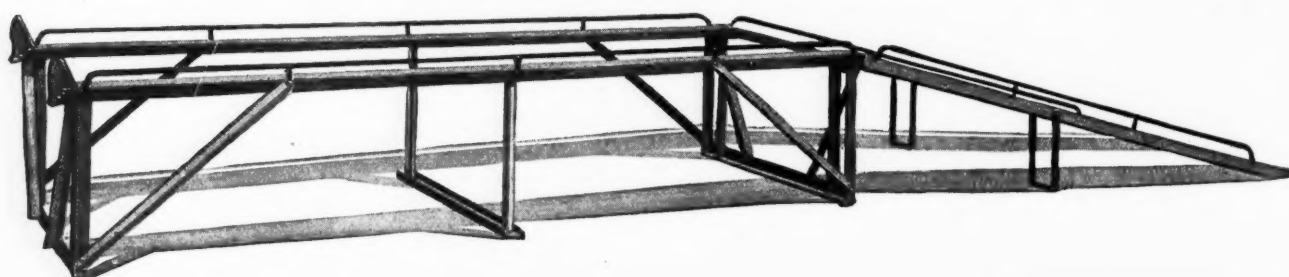
### Specifications

Length of horizontal channels .....	14 feet
Length of incline channels .....	12 feet
Height of horizontal channels .....	30 inches

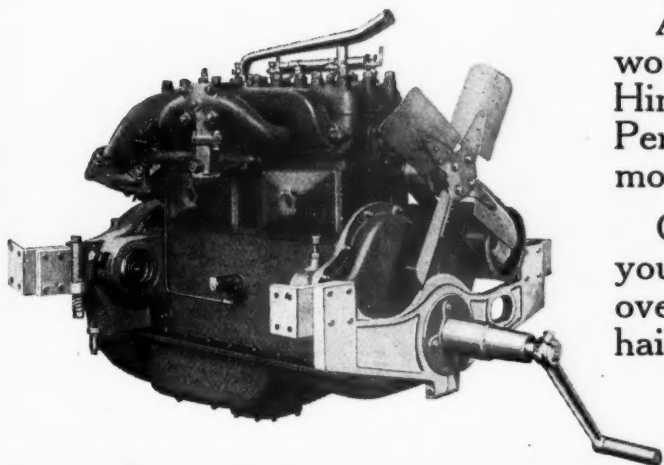
*Your own jobber can supply you.*

For bulletin completely describing the Manley Service Runway write to

**MANLEY MFG. CO., YORK, PA.**



# For Heavy-Duty Hauling



## HINKLEY HEAVY DUTY AUTOMOTIVE ENGINES

Our Himico Unit Power Plant substitutes an idealized engine, and a highly perfected sliding gear transmission, for your worn-out Ford motor and planetary set.



As original equipment, or to replace worn-out engines of other types, a Hinkley Engine yields more Ton-Miles-Per-Dollar, than any other heavy-duty motive power of which we know.

Cut out the engine troubles that drain your profits, and eliminate the major overhaul delays that are bringing gray hairs to the fleet boss, by standardizing on Hinkleys. The Hinkley Plan substitutes a factory-built engine for any ravelled motor in your fleet.

Ask for folder that tells all about it.

Models and adaptations for all sizes. Parts and Service Stations in 85 cities.

## for Ford Trucks

For little more than the cost of a major overhaul, you have a veritable Super-Ford.

Or you can buy the Himico Transmission separately, bolt it direct to your present motor, and banish forever all band problems, and power losses.

The Himico is the only sliding gear transmission that completely replaces your planetary set. Three forward speeds and reverse, with disc clutch. Emergency low—42 to 1—and power take-off, are available extras.

Not an attachment, but an actual replacement.

**Complete Himico  
Power Plant**

(And Your Old Block)

**\$184**

**Himico Trans-  
mission**

(Fits Your Ford Motor)

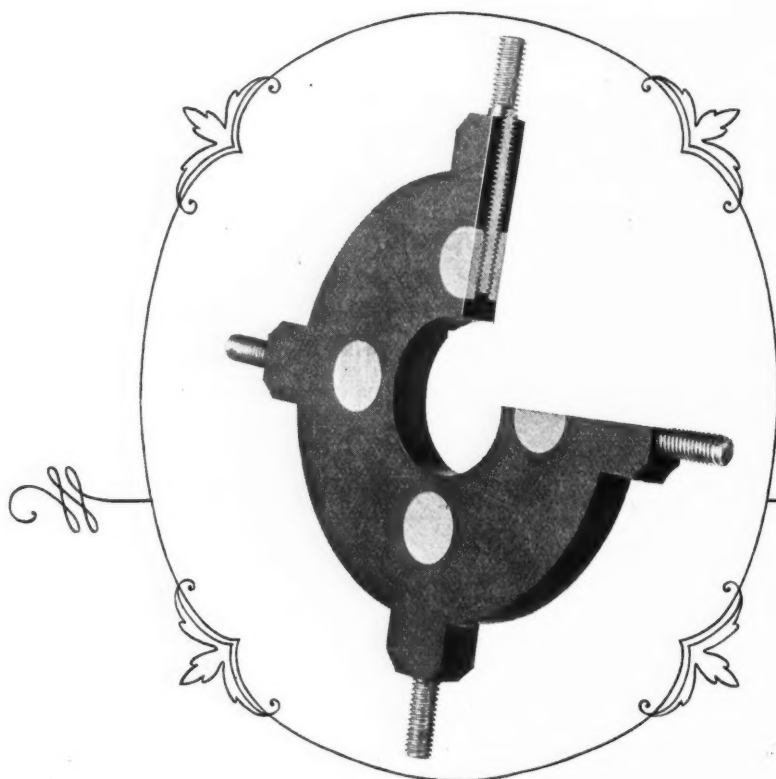
**\$137**

**HINKLEY MOTORS, INC.**

P. O. Box 839

DETROIT, MICH.

# HIMICO



Sectional view  
of LIFE TIMER  
"Commutator."

### Two Timers for the price of one

The Life Timer uses a Bakelite Commutator. It will not warp. Terminals and contact plugs are anchored into the Bakelite when it is molded; after which it is finished on both sides to 5-16 in. thickness.

The illustration shows the perfect contact between the terminals and plugs on each side. This feature makes the commutator reversible, giving two timers for the price of one.

*If*

you believe that Ford Owners will buy a \$2.00 Timer—providing that Timer will give them perfect service for more miles than they ever obtained from any other Timer—you can make a lot of money selling the

## Life Timer for Fords

For we can enable you to demonstrate the long life of the LIFE TIMER to any Ford owner, and do it quickly. Many Dealers, Service Stations and Repair Shops have been ringing the bells of their cash registers for over three years doing it.

Liberal discount makes it worth your while to ask your Jobber to send you a trial dozen together with a display carton.

**MECHANICAL PRODUCTION COMPANY**

Milwaukee, Wisconsin



**Price \$2.00**

### Life Timer Assembly

**ROTOR ARM** Die-cast aluminum alloy. Tobin bronze contact element revolves freely. Needs no oil. Functions perfectly even if Ford cam-shaft has end-play or wobble.

**CASE** Die-cast aluminum alloy. Won't warp or crack.

**COMMUTATOR** Bake-lite. Reversible.

**RING.** Die-cast aluminum alloy.





# EMPIRE BOLTS & NUTS



They yield no "scrap" because they are uniformly perfect. Their threads cannot strip. You cannot fracture them (*except by intention*). Their fit is gauge-like in accuracy. They save your men's time. They save your stockholders' money — — — — —



**RUSSELL, BURDSALL & WARD**  
**BOLT & NUT COMPANY**

**PORT CHESTER, N.Y.**

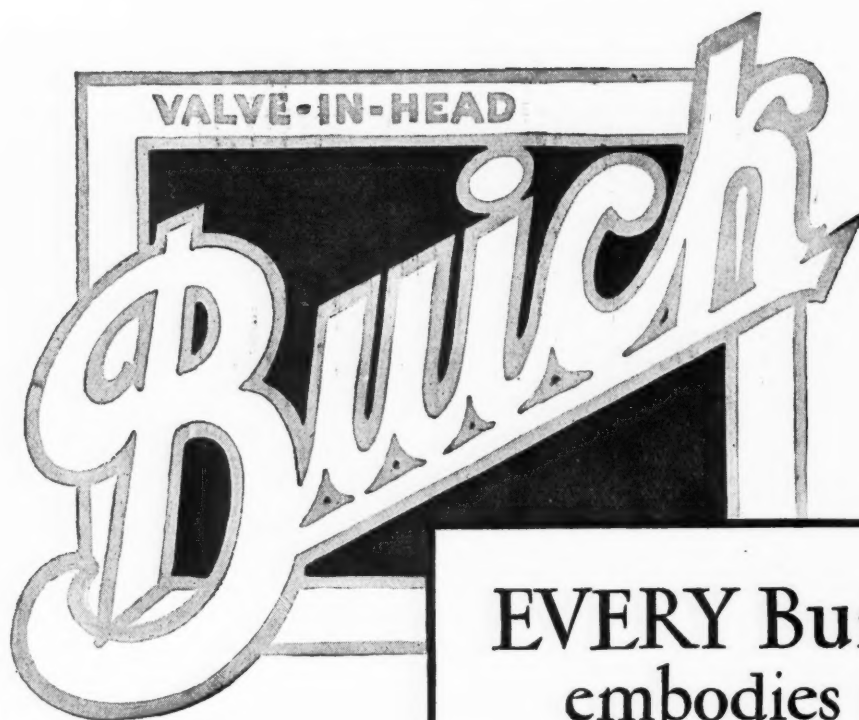
PEMBERWICK, CONN.

CHICAGO

SAN FRANCISCO

ROCK FALLS, ILL.

*Makers of Bolts, Nuts and Rivets Since 1845*



## EVERY Buick Model embodies these fund- amental Buick features

6-Cylinder Buick Valve-in-Head Engine  
 Buick Four-Wheel Brakes  
 Complete Automatic Engine Lubrication  
 Low Pressure Tires  
 Third Member Drive  
 One-piece Full Ventilating Windshield  
 (On all Closed Models)  
 Cantilever Rear Springs  
 Double Bearing Steering Gear  
 Buick Velvet Action Instantaneous Clutch

WHEN BETTER AUTOMOBILES ARE BUILT, BUICK WILL BUILD THEM

### Standard Sixes

Open Models  
 2-pass. Roadster . . . \$1150  
 5-pass. Touring . . . 1175

Closed Models  
 5-pass. Double Service  
 Sedan . . . . . \$1475  
 5-pass. Sedan . . . . 1665  
 4-pass. Coupe . . . . 1565  
 2-pass. Double Service  
 Coupe . . . . . 1375

Enclosed Open Models  
 (With Heaters)  
 2-pass. Roadster . . . \$1190  
 5-pass. Touring . . . 1250  
 All prices f.o.b. Buick Factories  
 Government Tax to be added

### Master Sixes

Open Models  
 2-pass. Roadster . . . . \$1365  
 5-pass. Touring . . . . 1395  
 7-pass. Touring . . . . 1625  
 3-pass. Sport Roadster . . 1750  
 4-pass. Sport Touring . . . 1800

Closed Models  
 5-pass. Sedan . . . . . \$2225  
 7-pass. Sedan . . . . . 2425  
 5-pass. Brougham Sedan . . 2350  
 3-pass. Country Club Special 2075  
 4-pass. Coupe . . . . . 2125  
 7-pass. Limousine . . . . 2525  
 Town Car . . . . . 2925

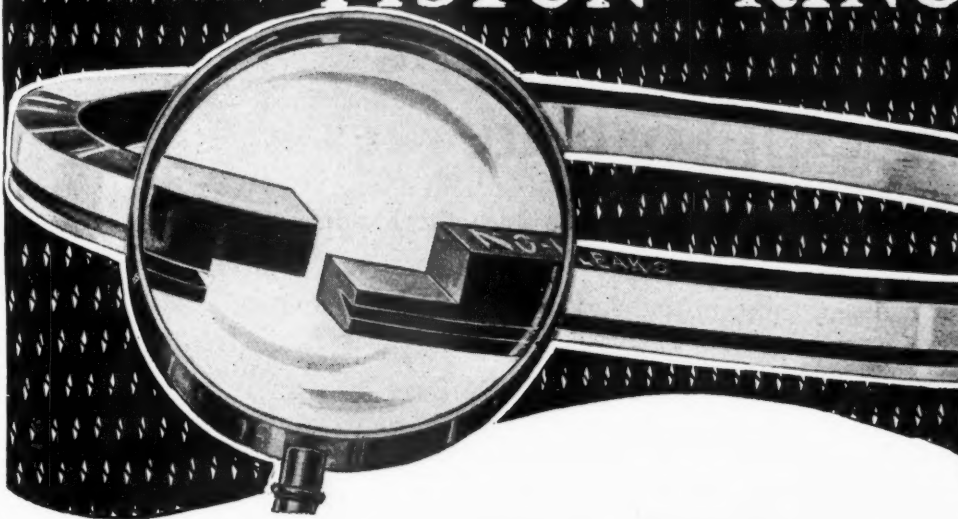
Enclosed Open Models  
 (With Heaters)  
 2-pass. Roadster . . . . \$1400  
 5-pass. Touring . . . . 1475  
 7-pass. Touring . . . . 1700

All prices f.o.b. Buick Factories  
 Government Tax to be added

*An Automobile Mechanic Suggested this Advertisement*

# NO-LEAK-O

## PISTON RINGS

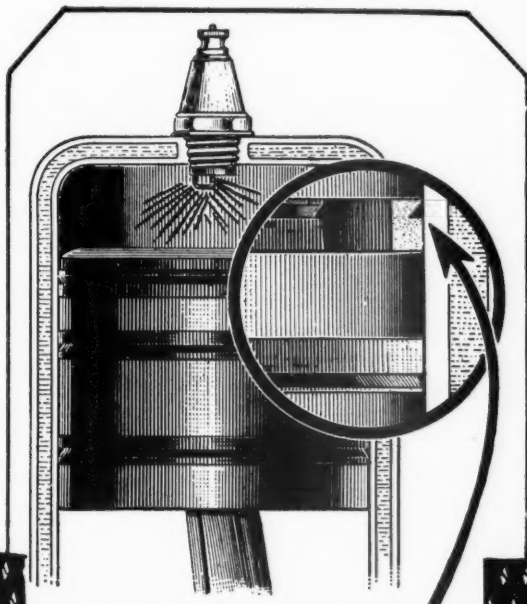


Important: In buying piston rings insist on the genuine No-Leak-O with the original "oilSEALing" groove, packed in this standard package bearing the famous ring and seal, our registered trade mark. Beware of imitations.

*A "Dead Cinch" they'll satisfy!*

"I have never been compelled to take down a set of No-Leak-O Rings that were not satisfactory—I have never received a single complaint after installing them." (Name upon request).

### Read the Reasons



1. Individually cast in one piece.
2. Made of finest close-grained tough grey iron.
3. Turned finish for quick seating.
4. Equalized pressure on cylinder walls.
5. The perfect oil seal means perfect combustion.
6. The original patented non-clogging "oilSEALing" groove insures perfect lubrication, prevents leakage due to worn or warped cylinder walls. Not a mere oil scraper.
7. The perfect fit plus the constant oil seal made possible by the angled groove makes it gas and oil tight under all conditions.
8. No-Leak-O service is unequalled. Prices 35c and up.
9. By reversing the top No-Leak-O ring, with the groove toward the firing chamber kerosene and unburnt gasoline is kept out of the crank case.
10. Standard replacement ring for ten years.

Write for valuable plain-language literature and booklet "How to Fit Piston Rings." Absolutely free. Let us tell you how our liberal dealer proposition can increase your profits.

Prices 35c and up

NO-LEAK-O PISTON RING CO.

Dept. 370, Muskegon, Mich.

Copyright 1924, No-Leak-O

**No Gas Can Pass this Groove**



# CHEVROLET

## Keeping the Line Up-To-Date

Chevrolet gives to dealers every possible merchandising advantage.

This year, many of those in the market for cars have shown a preference for De Luxe models.

Therefore, Chevrolet has built three fine De Luxe cars. In addition to the equipment of the standard line, these new models include disc wheels, nickel-plated radiator, kick plates, parking lights, front and rear bumpers, motor-meter, special deep upholstery and a double Duco finish in a rich blue with a beautiful red trim.

The Chevrolet policy of keeping its line strictly up-to-date at all times is but one of many desirable features of a Chevrolet franchise.

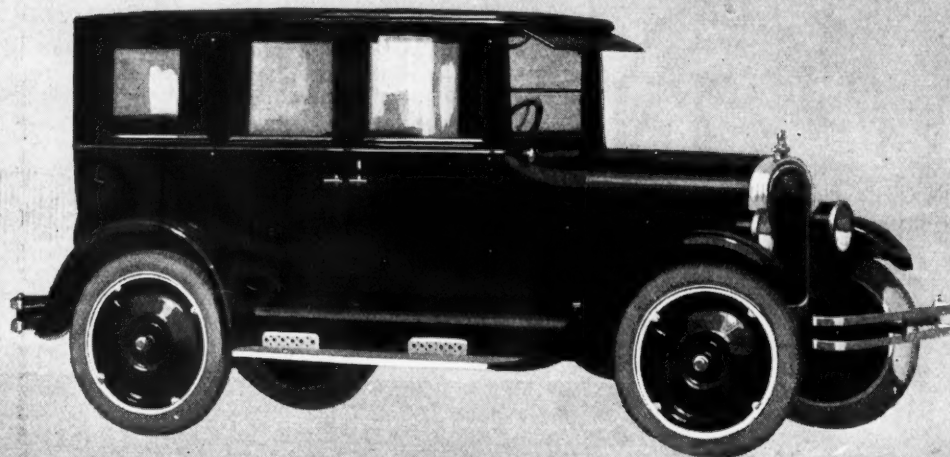
CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN  
*Division of General Motors Corporation*

PRICES OF  
DE LUXE MODELS  
De Luxe Touring - - \$640  
De Luxe Coupe - - 775  
De Luxe Sedan - - 940  
Prices f. o. b. Flint, Michigan

*for Economical Transportation*



Superior Roadster - - \$495  
Superior Touring - - 510  
Superior Utility Coupe 640  
Superior 4-Pass. Coupe - 725  
Superior Sedan - - 795  
Prices f. o. b. Flint, Michigan



*For*  
**BALLOON  
TIRES!**



No. 116 for Balloons sizes 4.40 to 5.20  
No. 126 for Balloons sizes 6.20 to 7.30



—and now **Walkers  
for Balloons**

**A** SPECIALLY designed Jack to get the greater lifting spread necessary: a long extension handle to clear gas tank, spare tires and bumper make the new Walker Balloon Tire Jack easy to handle, while the foot lift can be set  $3\frac{3}{4}$  inches from the ground to get under the low point when tire is flat.

*These jacks are now carried in stock by most jobbers. Write them or ask their salesmen.*

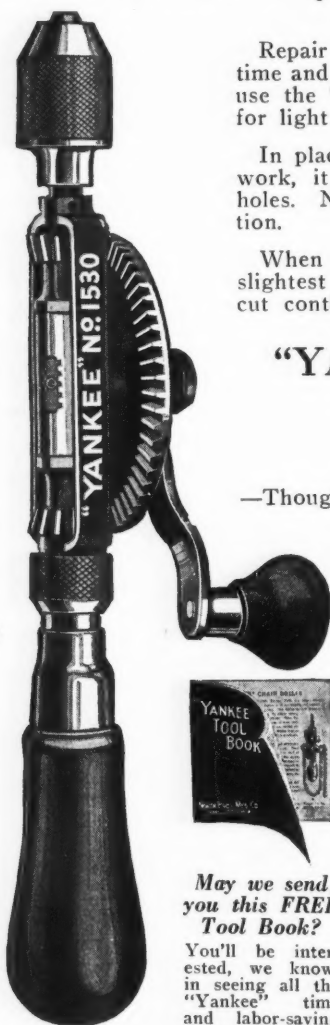
**Walker  
JACKS**

WALKER MANUFACTURING CO., Racine, Wisconsin

"He's drilling out a broken rivet on a steering column with a "Yankee" Ratchet Hand Drill. Thanks to the "Yankee" DOUBLE Ratchet he can work in the easiest position, as only a slight to and fro movement of crank is needed to make the drill cut continuously.



## Save the Flying Minutes



Repair shops know they can't waste time and make money. That's why they use the "Yankee" Hand Drill No. 1530 for light drilling jobs.

In places where ordinary drills won't work, it quickly drills clean, accurate holes. No need to tear down construction.

When set at DOUBLE Ratchet, the slightest movement of crank makes drill cut continuously.

### "YANKEE" Ratchet Hand Drill No. 1530

—Though a midget in size, it has every ratchet adjustment of the big "Yankee" Breast Drills and Hand Drills. Five in all—Plain Drill, Left-hand Ratchet, Right-hand Ratchet, DOUBLE Ratchet and Gears Locked. Weighs only 1¼ lbs. Measures only 10½ in. long.



May we send you this **FREE** Tool Book?

You'll be interested, we know, in seeing all the "Yankee" time and labor-saving tools. Write for it today!

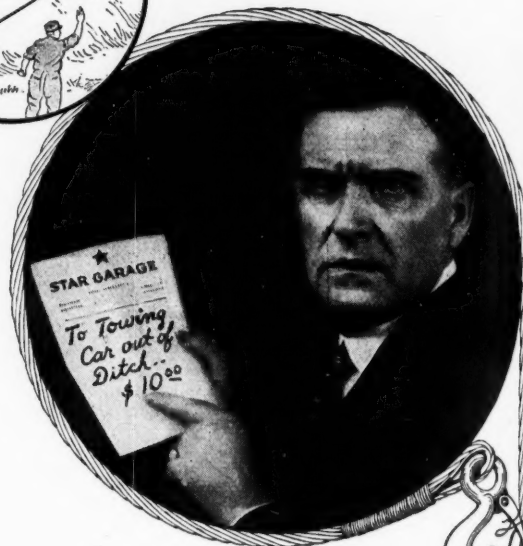
#### Some other "Yankee" Tools

Ratchet Breast Drills  
Ratchet Tap Wrenches  
Ratchet Screw-drivers  
Spiral Screw-drivers  
Automatic Push Drills

Dealers Everywhere sell "Yankee" Tools

NORTH BROS. MFG. CO.  
Philadelphia, U. S. A.

**"YANKEE" TOOLS**  
*Make Better Mechanics*



## "I Could Buy an Autowline for Half the Cost!"

Sure you can; for \$4.95 you can buy the *original* wire rope towline, and absolutely safeguard against emergencies. Light, compact, dependable, it's tow-home insurance at no more cost than a box of cigars!

One car-owner writes: "I have carried a Basline Autowline in five different cars, and have demonstrated it to many a traveler. It's sure *there* 'when a feller needs a friend.'"

But don't accept substitutes—there are many imitators—be sure you get Basline Autowline, made of world-famous Yellow Strand Wire Rope. Can be tucked under a seat Cushion. Snaps on instantly with patented Snaffle Hooks that cannot loosen. Now \$4.95, east of Rockies.

#### MONEY FOR JOBBERS AND DEALERS:

Basline Autowline pays you a good profit, it sells well, and is the *only* Nationally-Advertised towline on the market. Push it this season.

**BRODERICK & BASCOM ROPE CO.**  
ST. LOUIS—NEW YORK



GR-192





## The Standby of More Than Two Million Motorists

The popularity of the Shaler 5-Minute Vulcanizer is largely due to its simplicity. In five minutes this simple outfit makes a punctured tube practically as good as new. The repair is welded with heat. More vulcanizers are being sold this year than ever before. Think of the repeat business that means on Shaler Patch-&-Heat Units.

This steady repeat business all the year round on Shaler Patch-&-Heat Units pays you a good profit. The motorist who has once used the Shaler never goes back to the old-fashioned stuck-on patches. Some recognized dealer is sure to get the Shaler repeat sales because the Shaler is never sold by ten-cent stores or county-fair peddlers.

### Profitable Display

Our Bright, New Display Material will help you get the good from our big National Advertising. Write for it now—or ask your Jobber's Salesman.



### Tire Repair Equipment

Our complete line of vulcanizing equipment for tire repair shops—the most complete line in the world—is sold and recommended by practically every wholesale auto supply house in the U. S. and Canada.

**C. A. SHALER CO., 214 Fourth St., Waupun, Wis.**



## New Opportunities for the Garage Owner

Never in the history of the automotive industry have there been such opportunities for the shop equipped to handle re-conditioning work. With nearly 16,000,000 cars and trucks in service in the United States, every locality offers its quota of this class of business.

Why not start now to get your share? All you need is a set of Foster-Johnson re-conditioning tools and you can do better work than that turned out by a \$3,000 grinder.

## F-J Method Saves Both Time and Money

You can ream and hone an average cylinder block in from thirty to sixty minutes. This saves your customers' time and keeps the work moving through your shop faster. You can also handle each job more economically and with greater profit to yourself.

Foster-Johnson equipment includes: Piston and Cylinder Reamers and Hones, Kylin General Purpose Reamers and Reamer Sharpeners for servicing the tools you use.

*Write for our Station Manual and Complete Catalogue of Re-Conditioning Tools*

**FOSTER-JOHNSON REAMER CO.**

1308 Beardsley Avenue  
ELKHART, IND.

**DANGEROUS**



**WALL PRESSURE**

## Impossible With APEX

Have no fears—Genuine APEX Innerings can never score cylinder walls; never increase wall pressure; never cause over-heating; never even interfere with the oil film when properly installed.

Patented, exclusive, long reverse curves (shown above) can not force the piston ring outward—they gently cushion the piston rings, stabilize the piston and make the ring faces work true with the cylinder wall—a result impossible with sharply crimped, straight sided imitations.

No good jobber will willfully substitute. But be safe! Insist on APEX and if you can't get them order from us.

Guaranteed APEX Innerings are guaranteed to stop oil pumping, piston slap; increase power, performance and pick-up in any internal combustion motor.

**THOMSON MFG. CO., Dept. C, Peoria, Ill.**

20c ea.  
(retail) up  
to 3/4 in.  
wide or 5  
in. diam.



Patented  
in U. S.  
and Canada.

*"If it isn't an APEX—it isn't an INNERING."*

## Don't miss this business!

Installing Meachem Ring Gears pays you a mighty nice profit and it's the best cure there is for battered flywheel teeth.

You'll see many faltering flywheels this summer—watch for 'em—and have a Meachem assortment ready to give quick service.

**Make More Money**

To install—turn off battered teeth—shrink on the ring.

Write for our proposition.

Ring Dept.

**The Meachem Gear Corp.**

Syracuse, N. Y.





## Battery and Tool Boxes

All boxes produced by Victor are strong, light weight safes. They are made of 22 gauge cold rolled steel accurately formed and beautifully finished in hard baked enamel. They are rigid and rattle proof—built to fit their purpose.

These boxes are of the same high quality as the Victor line of accessories, being made to exacting standards.

Battery boxes No. 812 and 812-F are 12" x 8" x 10½". They give full protection to the battery. A hole for the cable is provided in the rear.

No. 811-A protects batteries installed underneath the Ford car. A sturdy bracket is provided to make the installation.

Tool box. No. 622 is made in the following sizes: No. 622—7¼" high, 22" long. No. 625—7" high, 25" long. No. 822—10½" high, 22" long. All of convenient width to fit on running board.

Stock the Victor Line of boxes and lamp accessories. They are profit winners in every season.



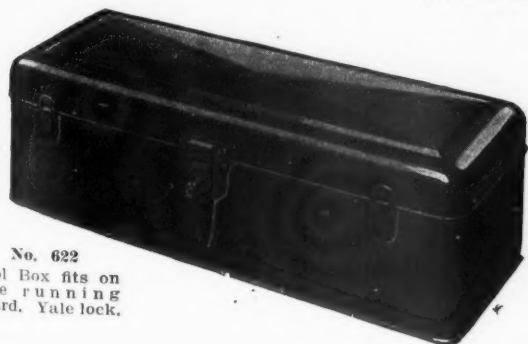
No. 812  
Battery box for the running board. Yale lock.



No. 812-F  
Same as No. 812. No lock. Lid held by suitcase catches.



No. 811-A  
Protects battery hung under Ford. Fits late models.



No. 622  
Tool Box fits on the running board. Yale lock.

The Cincinnati Victor Co.

714 Reading Road

Cincinnati, Ohio

## The New BETHLEHEM

"SELLING features galore—backed by a perpetual contract with a permanent corporation—that's the New Bethlehem Motor Truck for 1925."

HOWARD B. HALL,  
President,  
Bethlehem Motors  
Corporation of N. Y.,  
Allentown, Pa.



### If you want to sell or rent your business you can

- (1) Put signs in your windows—to attract the attention of those who pass by.
- (2) Put an ad in your daily paper—to be seen by some of your local prospects.
- (3) Get an agent or broker to make the sale and pay him a fat commission for his expense and trouble.
- (4) Put an ad in your business paper to be read by others in your line of business, some of whom may be looking for just such an opportunity as you have to offer.

There are thousands of men in this industry who are ambitious to be their own boss—they have saved their money to buy a business of their own and might pay you a higher price than you have yet been offered.

The cost is too small to cause hesitation. Undisplayed ads are only 6c a word. The quicker you send your copy the sooner the dividends on your investment.

**The Broadcaster**  
A DEPARTMENT THAT  
WILL FIND WHAT YOU WANT

### FOLLETT'S NEW MODEL TIME STAMP

—accounts for every labor minute



Learn the interesting details from our descriptive data.

Prints the year, month, day, hour, minute, A. M. or P. M. at the exact moment the plunger is pressed—like this, for example:

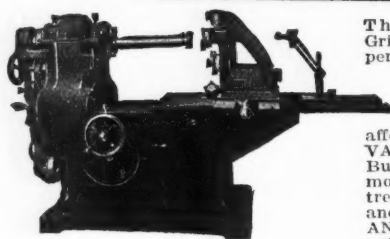
NOV 19 1920 4 31 PM

Tells when a job is started—and when it is finished. There can be no dispute over the time charge.

Absolutely automatic—except for winding. Every machine guaranteed.

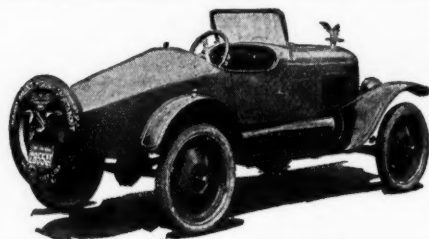
Follett Time Recording Co., 217 High Street, Newark, N. J.  
"Established Since 1904"

### LANDIS



The LANDIS Cylinder Grinding Machine is the perfected product of the world's largest exclusive grinder builders. Because of our volume we can afford to give you MORE VALUE for your money. Built expressly for automotive repair shops. Extremely simple in design and operation. Don't buy ANY machine without first getting a LANDIS quotation. Catalog.

Landis Tool Co., Waynesboro, Pa.  
New York Office—30 Church St.



**\$198**

List. Freight and tax extra. Subject to a most liberal discount.

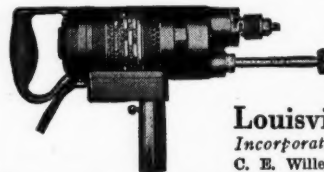
This all steel body by Mercury is a fast-selling sensation.

Write for full particulars.

MERCURY BODY CORPORATION  
Louisville, Kentucky

### Get This "Pioneer" \$65 Garage Special

Electric Drill  
and Valve Grinder



Greatest time and money saver, as well as money maker, for your shop—

"It Will Do The Work"

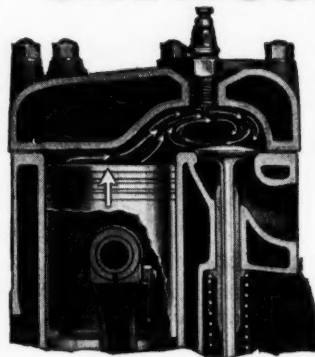
Louisville Electric Mfg. Co.  
Incorporated Louisville, Ky., U. S. A.  
C. E. Willey, Pres. J. B. McFerran, Secy.-Treas.

### New Departure Ball Bearings

Ball Bearings Do Not Wear

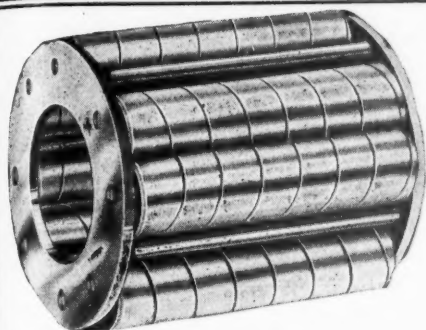
The New Departure Mfg. Co., Bristol, Conn. - Detroit - Chicago

### The Ricardo Head



A revolutionary improvement in engine construction that permits such outstanding advantages as higher compressions, greater speeds, increased power and superb motor flexibility under all speeds and loads—at an operating cost that is surprisingly low.

WAUKESHA  
Motor Company  
ENGINE BUILDERS  
Waukesha, Wisconsin  
New York, N. Y.



## Get them from your jobber

Strictly first-class Replacement Roller Bearings—

- built to exact sizes
- made of the finest bearing materials
- with extra heavy ribs for strength
- such are Little Giants, perfect replacement bearings, and

Distributed Exclusively thru Legitimate Jobbers. To enable your jobber to give you, the dealer, almost instant service on Little Giant Bearings, we have enlarged our manufacturing department and can deliver to jobbers the same day order is received. Better service! More convenient financial arrangements! Consumer satisfaction! If you replace with Little Giants and get them from your jobber!

Let husky Little Giants carry the Load!

ROLLER BEARING CO. OF AMERICA  
Frelinghuysen Ave. & Hunter St., Newark, N. J.  
We Make Bearings for Everything that Rolls

# LITTLE GIANT Roller Bearings

Effective!



Harmless!

## Sails Through Tar!

They like Pontoklene! Summer after summer it has been making life easy for the fellow who sits at the wheel and sees his polished car getting splashed with road oil and tar. Now he doesn't detour to get away from them. At the end of the trip he applies Pontoklene. In a few minutes the tar and grease are gone—the original lustre of the car is restored! He wants Pontoklene and more Pontoklene. Order a supply from your Jobber today. Retail at \$1.00 a can.

**THE PONTOKLENE COMPANY**  
2604 Main Street  
Norristown, Pennsylvania

"SURE HOLD"  
STEEL FLEXIBLE  
CAP  
PREVENTS  
SLIPPING

## MORRISON AUTOMATIC DOUBLE RANGE WORM DRIVEN JACKS

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A 100% BALLOON TIRE JACK. Most efficient for all MOTOR VEHICLES, from the lightest passenger car to the heaviest truck. Made in nine sizes.

The MORRISON LINE OF JACKS is low enough and high enough to meet every requirement, and is in great demand among the motoring public.

FOLLOW THE LEAD of the best automobile Engineers of America when you buy a jack. Standard equipment with more than fifty automobile manufacturers. We invite jobbers and dealers to write us for a good selling proposition.

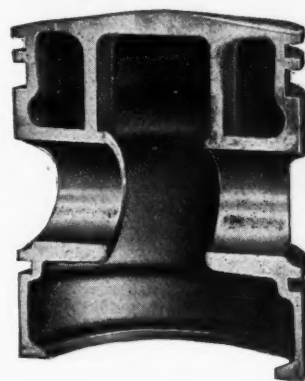
Easily lifted under or away from car by special socket. A feature your buyers will approve.

THE  
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MANUFACTURED BY THE  
**Woods Engineering Co.**  
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## Aluminite Pistons

Wear five times longer than die-cast pistons. They will not score, pump oil or slap. These Ribs carry heat away and prevent preignition. In use in 90 per cent of the successful racing motors. Weigh only one-third that of cast iron. Make a good four perform like a six. The result of nine years of successful operation. Used by winner of Pikes Peak Race. A combination of right alloy and right design. The one great replacement for all makes of cars. We also make Aluminite connecting rods. Special prices.



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Replacement for all makes of cars. Permit higher speeds and give any motor more power. Tests prove this. A quality replacement at a low price. Replacement list, prices and discounts sent on request.



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ENGINEERING CO.  
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All about you—in every town and city—are cars that need repainting. The "paint it yourself" field is tremendous. MORGAN'S RUBBER AUTO ENAMEL is well established in the three Pacific Coast States and is now establishing Distributor connections thruout the country.

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CELEBRATED 3 IN. RUBBER  
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Dries over night. Leaves a lasting lustre. Does not check or crack.  
Sells \$2.50 quart BLACK and \$2.75 quart for choice of 8 colors.

Write for territory.

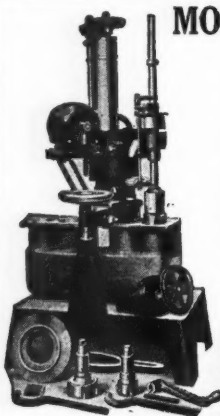
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## No Need to Repair Your Own Work with These Plates

A battery man's profits soon depart when his work doesn't hold up; and there is nothing that does as much harm in a job as poor plates. You'll find that Pore-Blown Plates give a stronger kick, because they have more capacity than other plates. Unlike most high capacity plates, they give long life, due to our patented process of giving more porosity. Your trial order will serve as proof. We handle all battery parts. Write for new catalogue.

**General Storage Battery Co.**  
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**Pore-Blown Plates**



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STORMIZING machines are truly money makers. They enable you to make biggest profits on every overhaul job. They handle all your cylinder renewing, accurately and efficiently, enabling you to turn out the high quality work that wins your customers' lasting approval. The automatic time and labor saving features make big profits possible by lowering operation costs.

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YOU CAN'T FORGET TO LOCK IT!

For  
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Automatic, safe and positive protection against theft. Approved by Underwriters' Laboratories. Earns lowest theft insurance rate.

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for Straight Fluted, Spiral Fluted or Valve Seaters.  
Opportunity for Distributors. Write for proposition.

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**GUNDLACH REAMER STONER**



You get quality work, SAE specification materials, and the right price if you send your connecting rods to a Watkins plant for rebuilding and refuse imitations of



New bolts and nuts, laminated shims, new piston pin bushing are part of the rod rebuilding at no extra charge.

New Bearing tinned in the rod and broached to mirror finish fits quickly to crankshaft and cuts time on flat rate repair jobs. Practice sending your rods in regularly. There's profit in it.

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"One Day Service from factory nearest you"

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Ready-shaped  
Inner-Rings

List Price  
\$3.00



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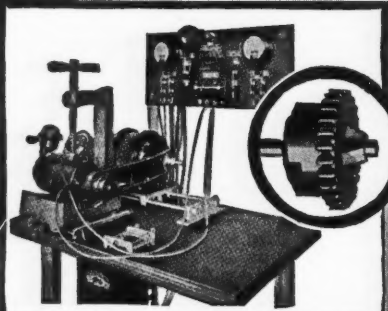
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BLADES CUT AT DIFFERENT ANGLES

Each successive blade cuts AT A DIFFERENT ANGLE from the one before it.

No CHATTER, no DIGGING IN—even in keyed holes.

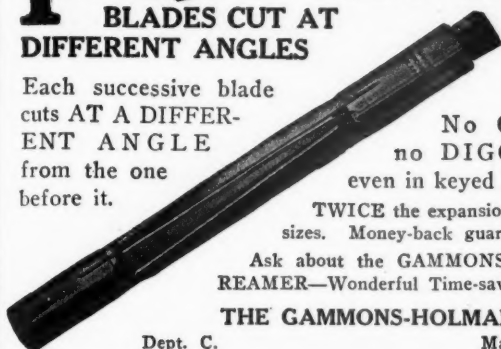
TWICE the expansion of others. All sizes. Money-back guarantee.

Ask about the GAMMONS TAPER PIN REAMER—Wonderful Time-saver.

THE GAMMONS-HOLMAN CO.

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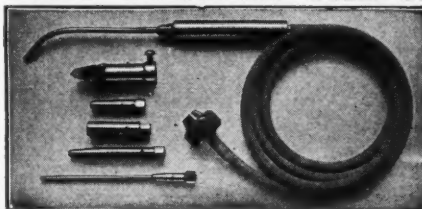
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Every purchaser of TORIT ACETYLENE TORCH No. 13 says it beats anything they ever saw. We guarantee it. USES NOTHING BUT ACETYLENE. Simply connect to Presto tank, light gas, and the outfit is put to work. Complete as above, with connection for Presto auto tank, and full instructions.

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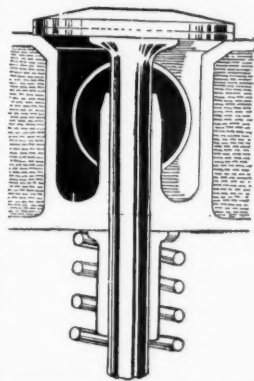
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Improve with use and make a good motor better. Installed in less time than re-grinding ordinary valves. They save their cost in one re-grinding period. Made for all poppet valve motors.

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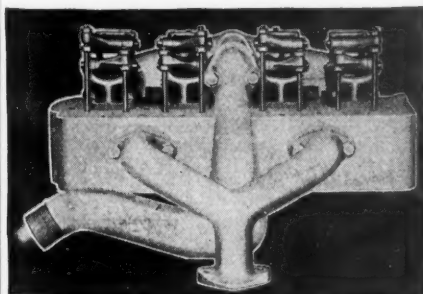
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## ROOF 16 OVERHEAD VALVE EQUIPMENT For Ford and Dodge Motors ROOF 8 VALVE HEAD FOR FORD MOTOR



Stupendous Power—Lightning Speed

Ford racing cars with Roof Equipment are rivals on mile and one half mile tracks of the highest priced racing cars. Doubles the pulling power of the Ford or Dodge pleasure car or truck. Hill climbing and general road work beyond wildest dreams of the owner. Complete—ready for installation—no machine work necessary.

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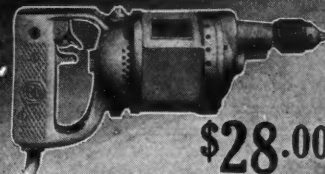


STAR BALL RETAINERS for Thrust, Magneto and Cup and Cone Types of Bearings—

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\$28.00

"With the Pistol Grip and Trigger Switch"

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Cylinder Re-Conditioning Tool  
Regrinds and refinishes cylinder bores. It is self-adjusting, self-aligning and self-centering. Write for Bulletin.

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Automobile  
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Manufactured by  
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Water Circulating Pump  
For Ford Cars and Trucks

Is as reliable as the Ford Car itself and assures a positive cooling system that constantly functions. No more overheating—No more freezing in travel—Made engineeringly correct of best materials—quickly and easily installed. Write for Dealer Discounts and complete information.  
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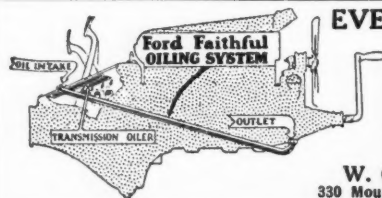
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**"Equal Strength — Full Length"**

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An Aristocratic Bumper at a Democratic Price



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Guaranteed not to cake or harden or to contain any Moisture, Mineral or Fatty Acids. Attractive proposition for Jobbers and Dealers.

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Regular, Oversize, Orphan  
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Write for the Book  
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describing many new uses for compressed air. Shows how to make an air compressor earn greater profits.  
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ALLEN  
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THE HYMAN PRESSED BODY CO.,

**YOU can handle this body PROFITABLY**

All steel construction provides lightweight with extreme strength. Outlast chassis. One design fills most light truck user's requirements. Ton and Half-ton sizes. Shipped knocked down. Low priced. Distributor and dealer terms liberal. Write.  
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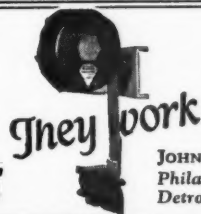
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**More  
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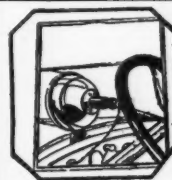
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Automotive Division

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**INSHIELD 8** 4 1/2 in. diameter. Heavy Nickel or Black Enamel. Made of heavy sheet brass. 21 c. p. Mazda precision type tipless bulb, silver, triple-plated reflector \$7.50  
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## Yes! Outperforms any car in its class

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### 140 Combinations —all in this ONE set

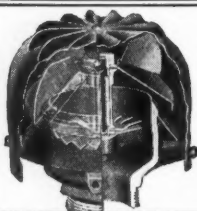
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Varley coils eliminate nearly all chronic ignition trouble. Save gas. Add power. Keep plugs clean. Stop misfiring. Save repairs. \$2.50 each. Write for full particulars.

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Cushion Bumper  
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Offers fullest measure of protection. You can sell it with credit to your store, at a satisfactory profit. Write to the Winterfront factory for prices.

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Two tools for the price of one. Holds tires securely. Expands and contracts rims. Attached instantly. Write for details.

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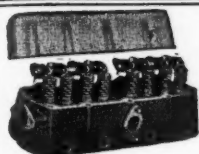
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"The Best-Equipped Shop  
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The remarkable showing of the three Fronty-Fords in the 500 mile race was due solely to the Frontenac Cylinder Head. This head is adapted for use on YOUR Ford by its designer and builder, Arthur Chevrolet. Book, "How to Build a Fronty-Ford," \$2; free with orders of \$50 or more. Write for FREE catalog.

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Stops the leaks in automobile water pumps. Mold it with your fingers. Makes a smooth metal bearing—adjustable and practically frictionless. At your Jobbers—Get it today. It does the trick. Put up in 1 lb. cans. If your Jobber doesn't carry it, write us direct. Price \$1.65 per pound, f. o. b. Conneaut, Ohio.

**The Conneaut Packing Company**

Conneaut, Ohio



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A complete car washing service. RUBBER COVERED—IMPOSSIBLE TO INJURE CAR. Used in connection with our Little Giant Water Savers, or can be applied to any 1/2 in. or 3/4 in. valve. Rubber Nozzle—for full water flow. Spray Nozzle—for general purposes. Spout Nozzle—for cutting mud from fenders, etc. Slot Nozzle—a sheet of water covering a large surface with force. PRICE—Set of four Nozzles, \$2.00 less dealers discount. **The Gaylord Manufacturing Company** Paterson, N. J.

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OVER 100 ACCURATE SHORT-CUTS TO GOOD WILL AND PROFIT ~ ~ ~  
"Thru your jobber - his service is economy"

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The Custom

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The Aristocrats of  
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7 Models - Open and Closed

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Stop Oil Pumping

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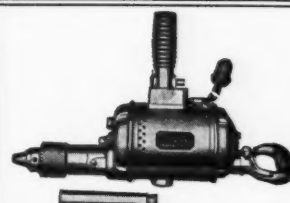


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A tool for every purpose. Long service makes them cost the least.

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Every  
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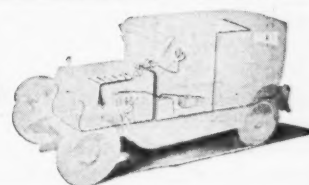
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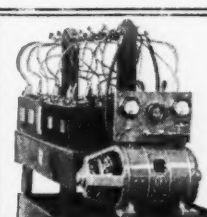
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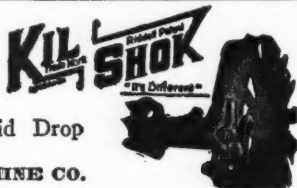
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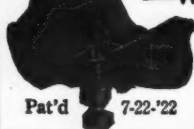


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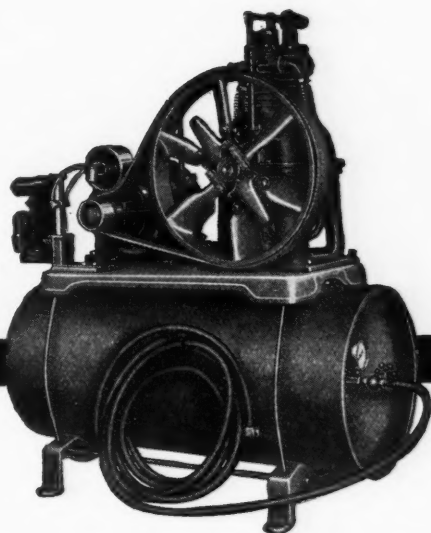
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8 Park St., Chatham, Ont., Canada





# Advertisements

Arntzen Headlight Kontrol, Inc.	95	Sav-Oil Ring Mfg. Co.	93
Cincinnati Electric Mfg. Co.	88	Service Equipment Associates.	94
Capton's, David, Sons Co.	54	Shaler, C. A., Co.	85
Cox Clock Mfg. Co., Inc.	96	Smalley Accessories Co.	90
Croming Mfg. Co.	92	St. Paul Welding & Mfg. Co.	91
		Stevens & Co.	95
		Stewart-Warner Speed. Corp.	92
		Storm Mfg. Co.	90
		Stromberg Motor Devices Co.	55
McQuay-Norris Mfg. Co.	94		
Manhattan Rubber Mfg. Co.	93	Thomas, W. H., Mfg. Co.	1
Mayley Mfg. Co.	76	Thompson Products, Inc.	90
Maxwell-Chrysler	8	Thompson, W. O., Mfg. Co.	92
Mechem Gear Corp.	86	Thomson Mfg. Co.	86
Mechanical Production Co.	78	Timken Roller Bearing Co.	90
Mercury Body Corp.	88	Tripp-Secord & Co.	94
Milwaukee Die Casting Co.	95		
Mitchell Specialty Co.	90	U. S. Air Compressor Co.	91
Moser Metal Products Co.	96	U. S. Auto Supply Co.	94
Mountain Accessory Co.	92	United Mfg. & Dist. Co.	94
Mon Motor Car Co.	64 & 65	Universal Industrial Corp.	92
Morgan Paint Mfg. Co.	90		
		Vellie Motors Corp.	68 & 69
		Vesta Battery Corp.	96
Nash Motors Co.	6		
New Departure Mfg. Co.	88	Walden-Worcester, Inc.	71
No-Leak-O Piston Ring Co.	81	Walker Mfg. Co.	83
North Bros. Mfg. Co.	84	Wall Pump & Compressor Co.	96
Norwalk Auto Parts Co.	92	Watkins Mfg. Co.	90
		Watson Co., John W.	93
Ohio Parts Co.	98	Waukesha Motor Co.	88
Olds Motor Works	7	Wayne Tool Mfg. Co.	96
		Weaver Mfg. Co.	93
Packard Electric Co.	95	Weidenhoff, Joseph & Co.	90
Packard Motor Car Co.	100	Welker-Hoops Mfg. Co.	95
Pamflet Co., The	96	Wilkening Mfg. Co.	96
Park Spring Co.	98	Willys-Overland, Inc.	52 & 53
Perless Motor Car Co.	56 & 57	Wood-Imes	92
Plus Winterfront Co.	94	Woods Engineering Co.	89
Pontoklene Co.	89		
		York Electric & Mach. Co.	96
R. & C. Manufacturing Co.	93		
Radiant Oil Co., Inc.	92	Zenith-Detroit Corp.	93
Ramsey Accessory Mfg. Corp.	96		
Republic Motor Truck Co.			
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Roller Bearing Co. of Amer.	89		
Rollin Motors Co.	75		
Russell, Burdall & Ward Bolt & Nut Co.	79		

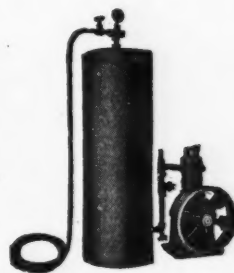


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Established 1854

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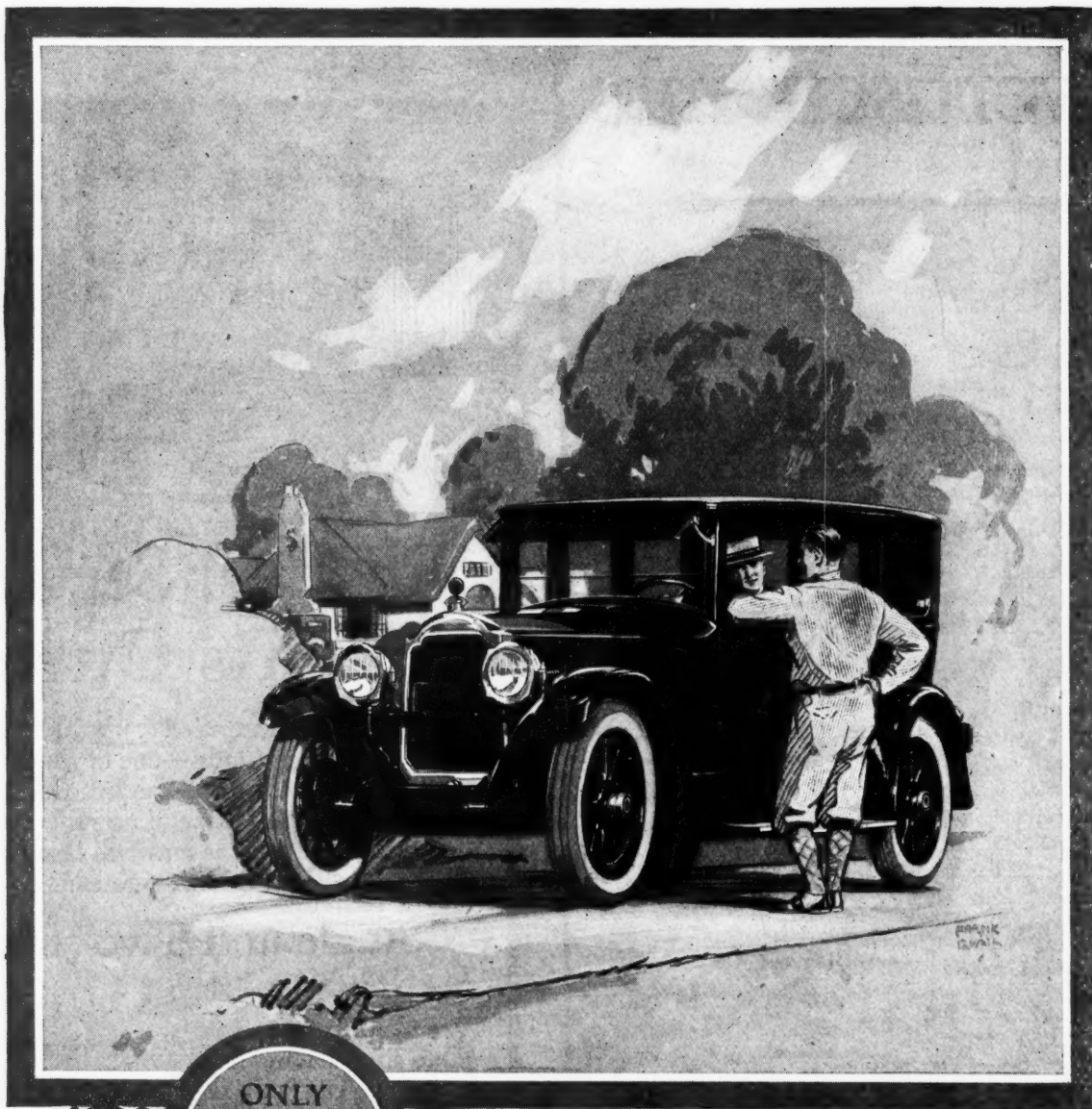
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# BOSCH

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TYPE  
600



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# FORDS

**\$12 <sup>75</sup>/<sub>100</sub>**  
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